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EMOS to ICC Planning and Scheduling File Formats and Detailed Activity Schedule Operational Timelines for the AM-1 Mission

White Paper

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Abstract

This document is a White Paper written as the precursor for a Data Format Control Book for EMOS Planning and Scheduling files between the EOC and the ICCs. It is intended for use by operations teams and DAAC personnel supporting instruments that ESDIS has designated as authorized users of this data. In addition to format specifications, it contains preliminary relevant file exchange message (DAS) timeline information that instrument operations need to use the planning and scheduling files. An issues list, Appendix C, identifies operations topics that were identified during preparation and review of this paper; all have been resolved with revision of timeline information in Section 4.

Keywords: activity, ASTER, ATC, DAR ID, DAS, EMOS, events, format, FOT, ICC, IOT, IST, MISR, load, orbit mnemonics, plans, reports, schedules

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Contents

4. DAS Timelines and Operations

5. Parameters for EMOS-LaRC DAAC Operations Agreement

List of Figures

List of Tables

Appendix A. Orbit Event Mnemonics

Appendix B. Example Detailed Activity Record

Appendix C. Issues

Abbreviations and Acronyms

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1. Introduction

1.1 Purpose

The need for this white paper surfaced during an August 25, 1999 meeting to redefine the tasks directed in Engineering Support Direction 78, ECS-EMOS/ECS-Science ICD for DAS. The meeting was attended by representatives of the Langley DAAC, ECS SDPS, ECS EMOS and ESDIS.

EMOS to ICC Planning and Scheduling file formats for the AM-1 mission are presently documented only in the ECS-ASTER ICD, but this information is also needed by MISR and potentially PM-1 instruments that wish to use the EMOS Filter Scheduler interface. The ECS-ASTER ICD should be modified by removing the DAS format information from Section 5 and Appendix E and placing it in an independent ESDIS CCB-controlled Data Format Control Document (DFCB), which will be the universal reference for all IOTs and should not be duplicated in other documents. It is expected that the ECS-ASTER ICD, and documents for other instruments, will then only reference the DFCB.

At the ESD 78 meeting, it also became clear that more information than the formats is required in the DFCB: The IOTs need definitive operational timeline information concerning the planning and scheduling files to understand how to design and set up their normal and emergency product generation operations procedures.

This White Paper is written solely as the prototype of the planned DFCB. It presents the format and timeline information needed by DAAC and IOT personnel in a single document, providing the opportunity for them to review it at the earliest possible date and to use it as a working document during resolution of operations issues until publication of the DFCB.

This White Paper contains specifications for the ASTER and MISR instruments only. Other instruments may be included in the derivative DFCB at ESDIS direction.

An interface control document for the ingest of DAS files and EMOS history files into the ECS archives will be prepared. That interface is not within the scope of this white paper.

1.2 Organization

This paper is organized as follows:

Section 2 contains references to applicable documents. Section 3 contains format and filename specifications for EMOS planning and scheduling files. Section 4 presents operational timeline information relevant to the Detailed Activity Schedule. Section 5 holds information that will be needed in an operations agreement between the Langley Research Center DAAC and EMOS. A list of representative orbit event mnemonics is collected in Appendix A. Appendix B is an example Detailed Activity Schedule generated by the MMS. Appendix C tracks a list of related issues.

1.3 Review and Approval

This White Paper is an informal document submitted with the intent that review and comments will be forthcoming. It will be approved at the ECS Office Manager level and also by the ESDIS Science Systems Development Deputy Manager before distribution.

The concepts and specifications presented here are expected to migrate into a DFCB for EMOS to ICC Planning and Scheduling Files. The standards and concepts in this White Paper are valid until ESDIS direction for revision of this White Paper or ESDIS approval and release of that DFCB.

Questions regarding technical information contained within this Paper should be addressed to the following ECS and/or GSFC contacts:

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2. References

423-41-02	Functional and Performance Specification for the ECS Project
	EOS AM-1 Project Data Base (PDB)
	EMOS System Operations and Maintenance Manual, Appendix X, Mission Management System Operations Concept
	EMOS Operations Tool Manual
552-FDD-96/010R0UD0	Earth Observing System (EOS) AM-1 Flight Dynamics System (FDS)/EOSDIS Core System (ECS) Interface Control Document (ICD)
	Operations Tools Manual for MMS 2.5, May 1999, Draft

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3. Planning and Scheduling File Formats

3.1 Overview

This section describes the interfaces for data and information exchange between EMOS and the IOTs. It defines the format for ten planning and scheduling message files, which are listed in Section 3.1.4.

3.1.1 Short Term Schedule

A Short Term Schedule (STS) is sent by an IOT to the EOC to provide initial activities, with specific timing, to the EOC for use in planning of AM-1 spacecraft resources and Tracking and Data Relay Satellite System (TDRSS) contact times. The STS identifies the resources required by the instrument during the period of time covered by the STS.

The STS may be sent in either schedule or analysis mode. When the Scheduling Mode field is set to "ANALYSIS", the activities are scheduled on a copy of the master schedule (known as a "What If" plan) and are checked for constraint violations. A Preliminary Resource Schedule (PRS) in analysis mode (also known as a PRA) is returned to the ICC's designated directory. If the Scheduling Mode field is set to "SCHEDULE", the file is first checked to see if any portion of it overlaps a locked portion of the EOC master schedule. If no portion of the STS overlaps a locked portion of the master schedule, then the master schedule is modified and the results are returned as a PRS to the ICC's designated directory. If there is an overlap into a locked portion of the master schedule, then the file is treated as a late change: Scheduling is performed on a copy of the master schedule, and no results are returned until the FOT has decided whether or not to incorporate the late change into the master schedule. If the FOT does accept the changes, then the updated DAS is generated; otherwise the FOT notifies the IOT via phone or email that the late change has been rejected. The flow of the Schedule or Analysis Mode STS can be viewed in Figure 3-1, as part of the Filter Scheduler's behavior.

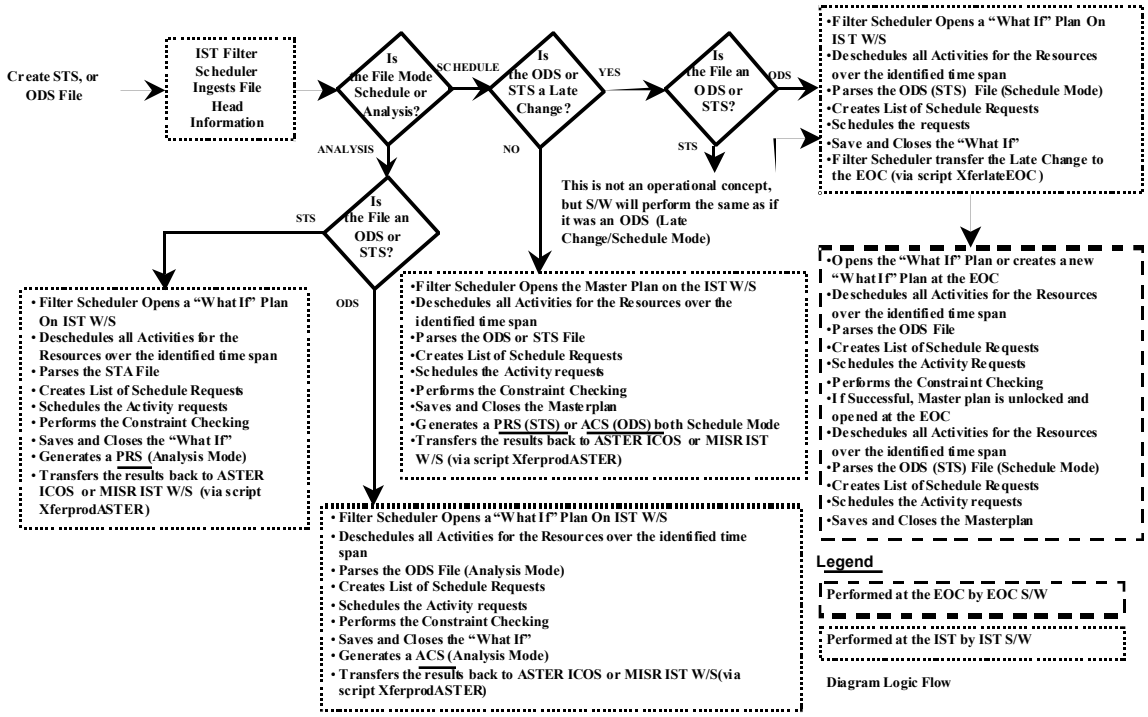

Figure 3-1. Filter Scheduling Behavior Diagram

3.1.2 One Day Schedule

A One Day Schedule (ODS) also may be sent in either schedule or analysis mode. Its purpose is to provide the EOC with the schedule of planned instrument activities, including schedule times and resource needs for a target day.

An ODS may be sent to the IST workstation in either schedule or analysis mode. When the Scheduling Mode field is set to "ANALYSIS", the activities are scheduled on a copy of the master schedule (known as a "What If" plan) and are checked for constraint violations. An Activity Schedule (ACS) in analysis mode (also known as an ACA) is returned to the ICC's designated directory. If the Scheduling Mode field is set to "SCHEDULE", the file is first checked to see if any portion of it overlaps a locked portion of the EOC master schedule. If no portion of the STS overlaps a locked portion of the master schedule, then the master schedule is modified and the results are returned as an ACS to the ICC's designated directory. If there is an overlap into a locked portion of the master schedule, then the file is treated as a late change: Scheduling is performed on a copy of the master schedule, and no results are returned until the FOT has decided whether or not to incorporate the late change into the master schedule. If the FOT does accept the changes, then the updated DAS is generated; otherwise the FOT notifies the IOT via phone or email that the late change has been rejected. See Figure 3-1 for the behavior of the ODS in Schedule and Analysis mode, including the late change overlap.

3.1.3 Detailed Activity Schedule

The Detailed Activity Schedule (DAS) is provided to the ECS ICCs in their designated directories. The purpose of the DAS is to provide the conflict-free schedule that is used by the EOC to generate the AM-1 Spacecraft Control Computer (SCC) stored command loads and ground script. The DAS for a target day becomes available at the EOC when the DAS is generated for the EOC to prepare the operations day products (ground script and command loads). The DAS is then FTP'd to the ASTER GDS (ICOS) and to the LaRC DAAC (for MISR). Any registered recipient may receive a copy of the DAS (contact the FOT to be added to the list of DAS recipients). The DAS contains activities for all AM-1 subsystems and instruments, including TDRSS contact activities.

3.1.4 Message Conventions

The data items in the instrument planning and scheduling messages are in standard 8-bit ASCII format, unless stated otherwise. All data fields are fixed length fields. Data within the data fields shall be left-justified; if the data does not fill the entire length of the data field, the remaining bytes shall be filled with ASCII blanks. Unused data fields shall be filled with ASCII blanks.

Date and time fields are expressed in Universal Time Coordinated (UTC), unless stated otherwise.

Planning and Scheduling data files are limited in size to a maximum of 2 GB (the maximum size of a UNIX file). The type of file is determined by data in the Planning and Scheduling Data Header. The file name conventions for Planning and Scheduling input data files can be chosen by the instrument teams. Planning and Scheduling output data files are uniquely identified by the EMOS file naming convention. Tables 3-1 and 3-2 give the input file names used by ASTER and MISR, respectively, as well as the EMOS file naming conventions.

Table 3-1. ASTER Message/File Exchange Table (1 of 2)

Message/File Title	Scheduling Mode	File Naming Convention*	File Type	Header "Message Type"	Header "Scheduling Mode"
Short Term Schedule	Schedule	ASTER_STS_yyyydddnnn.txt	Input	STS	SCHEDULE
Short Term Schedule	Analysis	ASTER _STA_yyyydddnnn.txt	Input	STS	ANALYSIS
Preliminary Resource Schedule	Schedule	EOC _PRS_yyyydddnnn.txt	Output	PRS	SCHEDULE
Preliminary Resource Schedule	Analysis	EOC _PRA_yyyydddnnn.txt	Output	PRS	ANALYSIS
One Day Schedule	Schedule	ASTER _ODS_yyyydddnnn.txt	Input	ODS	SCHEDULE

Table 3-1. ASTER Message/File Exchange Table (2 of 2)

Message/File Title	Scheduling Mode	File Naming Convention*	File Type	Header "Message Type"	Header "Scheduling Mode"
One Day Schedule	Analysis	ASTER _ODA_yyyydddnnn.txt	Input	ODS	ANALYSIS
Activity Schedule	Schedule	EOC _ACS_yyyydddnnn.txt	Output	ACS	SCHEDULE
Activity Schedule	Analysis	EOC _ACA_yyyydddnnn.txt	Output	ACS	ANALYSIS
Detailed Activity Schedule	Schedule	EOC _DAS_yyyydddnnn.txt	Output	DAS	SCHEDULE
Request for EOC Schedule	Schedule	ASTER _REQ_yyyydddnnn.txt	Input	REQ	SCHEDULE

* yyyyddd is the four-digit year and the three-digit day-of-year for the date of message generation and nnn is a unique sequential number (reset to 001 at the start of each day) assigned by the originator of the message each day.

Table 3-2 MISR Message/File Exchange Table

Message/File Title	Scheduling Mode	File Naming Convention*	File Type	Header "Message Type"	Header "Scheduling Mode"
Short Term Schedule	Schedule	MISR_STS_yyyydddnnn.txt	Input	STS	SCHEDULE
Short Term Schedule	Analysis	MISR _STA_yyyydddnnn.txt	Input	STS	ANALYSIS
Preliminary Resource Schedule	Schedule	EOC _PRS_yyyydddnnn.txt	Output	PRS	SCHEDULE
Preliminary Resource Schedule	Analysis	EOC _PRA_yyyydddnnn.txt	Output	PRS	ANALYSIS
One Day Schedule	Schedule	MISR _ODS_yyyydddnnn.txt	Input	ODS	SCHEDULE
One Day Schedule	Analysis	MISR _ODA_yyyydddnnn.txt	Input	ODS	ANALYSIS
Activity Schedule	Schedule	EOC _ACS_yyyydddnnn.txt	Output	ACS	SCHEDULE
Activity Schedule	Analysis	EOC _ACA_yyyydddnnn.txt	Output	ACS	ANALYSIS
Detailed Activity Schedule	Schedule	EOC _DAS_yyyydddnnn.txt	Output	DAS	SCHEDULE
Request for EOC Schedule	Schedule	MISR _REQ_yyyydddnnn.txt	Input	REQ	SCHEDULE

* yyyyddd is the four-digit year and the three-digit day-of-year for the date of message generation and nnn is a unique sequential number (reset to 001 at the start of each day) assigned by the originator of the message each day.

3.1.5 Formats

Section 3.2 contains the format of the file header used for all EMOS planning and scheduling messages. Sections 3.3 through 3.7 describe the content of the schedule messages in terms of the records present. The detailed internal record formats for the schedule messages -- i.e. Activity Records, Parameter Records, ASTER DAR ID Records, Mode Records, Constraint Records, and Comment Records – are then presented in Section 3.8

3.1.6 Timelines

Detailed DAS timeline information necessary for a successful planning and scheduling interface between the IOT and the EOC is given in Section 4.

3.2 Planning and Scheduling Data Header

All of the instrument planning and scheduling messages exchanged between the IOT and FOT will use the standard Planning and Scheduling Data Header shown in Table 3-3.

Table 3-3. Planning and Scheduling Data Header Format (1 of 3)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Message Type	Identifies the type of message being transmitted	ASCII (3 B)	STS: Short Term Schedule ODS: One Day Schedule REQ: Request for EOC Schedule Transmission to the IOT	PRS: Preliminary Resource Schedule ACS: Activity Schedule DAS: Detailed Activity Schedule
Message ID	The message ID is formatted as “yyyydddnnn”, where “yyyyddd” represents the four digit year and three digit day of year that the message was sent. The “nnn” portion of the ID is an incrementing sequence number identifying the scheduling message that was sent on that day. The incrementing sequence number shall begin with "001". The Message ID and the Message Type uniquely identify the Planning and Scheduling Message that is being sent.	ASCII (10 B)	yyyy: 1995 - 2100 ddd: 001 - 366 nnn: 001 - 999	yyyy: 1995 – 2100 ddd: 001-366 nnn: 001-999
Source	Identifies the sender of the message.	ASCII (3 B)	AST: ASTER Instrument Control Center MIS: MISR Instrument Control Center.	EOC

Table 3-3. Planning and Scheduling Data Header Format (2 of 3)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Destination	Identifies the intended receiver of the message	ASCII (3 B)	EOC	AST: ASTER Instrument Control Center MIS: MISR Instrument Control Center In the case of a DAS, where there is no input file and only one DAS file is created for all recipients, AST will be used as the Destination.
Spacecraft Name	Identifies the spacecraft name	ASCII (3 B)	AM1: EOS AM-1 Spacecraft	AM1: EOS AM-1 Spacecraft
Instrument Name	Identifies the instrument name	ASCII (3 B)	AST: ASTER MIS: MISR	AST: ASTER MIS: MISR This field contains the same value as the Instrument Name in the input file. In the case of a DAS, where there is no input file and only one DAS file is created for all recipients, AST is used as the Instrument Name.
Scheduling Mode	Specifies whether the activities identified in the message are to be scheduled on the EOC master schedule (SCHEDULE), or checked for constraints only for "what-if" analysis (ANALYSIS). For Message Type = "REQ" or "DAS", Scheduling Mode will always = "SCHEDULE".	ASCII (8 B)	SCHEDULE: Schedule on master EOC schedule ANALYSIS: Constraint-check only	SCHEDULE: Schedule on master EOC schedule ANALYSIS: Constraint-check only
Number of Days in File	The number of days in file is an integer that identifies the number of days of schedule data contained in this file. Partial days will be rounded up (e.g. 0.4 days will be represented as 1). For Message Type = REQ, this value should be "00".	ASCII (2 B)	00 - 99	00 – 99
Schedule Start Time	The Schedule Start Time must be less than or equal to the earliest activity start time contained in this schedule. The start time will be identified with the following format: yyyydddhhmmss. For Message Type = REQ, this field should contain the start time of the schedule to be transmitted to the ICC.	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59

Table 3-3. Planning and Scheduling Data Header Format (3 of 3)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Schedule Stop Time	The Schedule Stop Time must be greater than or equal to the latest activity start time contained in the message contents. The stop time will be identified with the following format: yyyydddhhmmss. For Message Type = REQ, this field should contain the latest activity start time in the schedule to be sent to the ICC.	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59
Number of Scheduling Resources	The number of scheduling resources affected by this schedule. This field only applies to the STS and the ODS. This field will be set to zero for Request for EOC Schedules, Preliminary Resource Schedule, Activity Schedule, and Detailed Activity Schedule.	ASCII (2 B)	00 - 99	00
Scheduling Resources	This field repeats (occurrences = "Number of Scheduling Resources" [previous field]). These fields contain the scheduling resource names that are affected by this schedule.	ASCII (40 B)	Each instrument has its own valid list of resource names. The valid scheduling resource names are controlled by the FOT.	Not applicable, since output files always have Number of Scheduling Resources = 00
Number of Records in File	The number of records in file is an integer that identifies the number of records contained within this file (including the Planning and Scheduling Data Header).	ASCII (8 B)	00000001 - 99999999	00000001 - 99999999
Record Terminator	Identifies the end of the Planning and Scheduling Data Header	ASCII (1 B)	\n (new line character)	\n (new line character)

3.3 Short Term Schedule (STS)

3.3.1 General

The IOT sends the STS to the IST workstation where the STS is processed. If the STS is in the Schedule Mode and is a Late Change, the STS is forwarded to the EOC via the ICC LAN. In any case the STS is scheduled on either the Master plan or a "What If" Plan which is a copy of the master plan. The purpose of the STS is to provide initial activities, with specific timing, to the EOC for use in planning of AM-1 spacecraft resources and Tracking and Data Relay Satellite System (TDRSS) contact times. The STS identifies the resources required by the instrument during the period of time covered by the STS.

The Planning and Scheduling Data Header contains fields that indicate the number of scheduling resources and scheduling resource names that are affected by this STS. For STSs where the "Scheduling Mode" field is set to "SCHEDULE", the activities specified in the STS replace those activities on the affected resources on the EOC master schedule where the activity start

times are equal to or between the “Start Time” and “Stop Time” field values in the Planning and Scheduling Data Header (unless the STS is a Late Change – see section 3.1.1 for details). Note that an STS that contains no activity records results in the deletion of all instrument activities on the affected resources whose Start Times fall within the inclusive (equal to or between) window identified by the Schedule Start Time and Schedule Stop Time fields in the Planning and Scheduling Data Header. When the “Scheduling Mode” field is set to “ANALYSIS”, the activities are checked for constraints only (i.e., the EOC master schedule is not modified) and the analysis results data format is the same as the SCHEDULE data format (with Scheduling Mode = ANALYSIS).

3.3.2 Detailed Data Description

The STS is described in Table 3-4. Refer to Section 3.8 for actual formats of the STS data records.

The Planning and Scheduling Data Header is the first record of the STS. The Planning and Scheduling Data Header specifies the Scheduling Mode of the STS as well as the Start Time and Stop Time of the activities that are included in the STS.

Table 3-4. Short Term Schedule Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted, the scheduling mode, and the time frame covered by the STS	ASCII (variable)	See Table 3-3
Activity Records, Parameter Records, DAR ID Records (ASTER), Comment Records.	Short Term Schedule Data.	ASCII (variable)	See Tables 3-9 through 3-11 and 3-15

The Planning and Scheduling Data Header is followed by a list of Activity Records, Parameter Records, DAR ID Records (ASTER only), and Comment Records. Activity Records are grouped by resource, and sorted by ascending interval order within those groupings. The STS contains Activity Records for valid Data Base Defined Activities only. (Refer Section 3.8.1 for more information about Activity Records.) If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters.

If an Activity Record specifies that the number of DAR IDs (ASTER only) is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s).

Comment Records may be inserted anywhere in the STS after the Planning and Scheduling Data Header, except between an Activity Record and its associated Parameter Record(s) or DAR ID Record(s).

A sample of an STS file layout is shown in Figure 3-2. (Note: This figure is true for both ASTER and MISR.)

3.4 Preliminary Resource Schedule

3.4.1 General

The Preliminary Resource Schedule (PRS) is provided at the ECS IST. The purpose of the Preliminary Resource Schedule is to provide all scheduled spacecraft and instrument activities, including TDRSS contact activities, to the IOT for the target week. The Preliminary Resource Schedule is generated in response to the STS (unless the STS was a Late Change – see Section 3.1.1 for details). No PRS is issued for a late change.

3.4.2 Detailed Data Description

The Preliminary Resource Schedule is described in Table 3-5. Refer to Section 3.8 for actual formats of the PRS data records.

The Planning and Scheduling Data Header is the first record of the Preliminary Resource Schedule. The Planning and Scheduling Data Header specifies the Scheduling Mode of the Preliminary Resource Schedule as well as the Start Time and Stop Time of the activities included in the Preliminary Resource Schedule. A Preliminary Resource Schedule with Scheduling Mode = SCHEDULE is sent in response to a STS with Scheduling Mode = SCHEDULE (unless the STS was a Late Change – see Section 3.1.1 for details). A Preliminary Resource Schedule with Scheduling Mode = ANALYSIS is sent in response to a STS with Scheduling Mode = ANALYSIS.

Table 3-5. Preliminary Resource Schedule Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted, the scheduling mode, and the time frame covered by the Preliminary Resource Schedule.	ASCII (variable)	See Table 3-3
Activity Records, Parameter Records, DAR ID Records, Mode Records, and Constraint Records.	Preliminary Resource Schedule Data.	ASCII (variable)	See Tables 3-9 through 3-13 and 3-15

The Planning and Scheduling Data Header is followed by a list of Activity Records, Parameter Records, DAR ID Records (ASTER only), Mode Records, then Constraint Records.

Activity Records are in ascending start time order. The Activity Records with their associated Parameter Records (and DAR ID Records) appear first, followed by Mode Records, then Constraint Records. If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters.

If an Activity Record specifies that the number of DAR IDs is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s).

Mode Records appear in ascending instrument mode time order. The mode characterizes an instrument or subsystem's operational state. Mode Records are generated by EMOS as a result of scheduling activities into the mission plan.

Mode Records are followed by a listing of Constraint Records. Constraint Records appear in ascending constraint start time order. Constraint Records appear as needed to identify errors with the input file (the STS), as well as scheduling constraint violations against a scheduled activity. Scheduling constraints are identified as either "hard" or "soft" constraints. Hard constraints must be resolved prior to generation of the Detailed Activity Schedule (see Section 4 for timeline information). For soft constraints, the necessary coordination for constraint resolution is performed between the IOT and the EOC.

A sample of the Preliminary Resource Schedule file layout is shown in Figure 3-3.

3.5 One Day Schedule (ODS)

3.5.1 General

The IOT sends the ODS to the IST workstation where the STS is processed. If the STS is in the Schedule Mode and is a Late Change, the STS is forwarded to the EOC via the ICC LAN. In any case the ODS is scheduled on either the Master plan or a "What If" Plan, which is a copy of the master plan. The purpose of the ODS is to provide the EOC with the schedule of planned instrument activities (including scheduled times and resource needs) for a target day.

The Planning and Scheduling Data Header contains fields that indicate the number of scheduling resources and scheduling resource names that are affected by this ODS. For ODSs where the "Scheduling Mode" field is set to "SCHEDULE", the activities specified in the ODS replace those activities on the affected resources on the EOC master schedule where the activity start times are equal to or between the "Start Time" and "Stop Time" field values in the ODS Planning and Scheduling Data Header (unless the ODS is a Late Change – see Section 3.1.2 for details). Note that a ODS that contains no activity records will result in the deletion of all instrument activities on the affected resources whose Start Time falls within the inclusive (equal to or between) window identified by the Schedule Start Time and Schedule Stop Time fields in

the Planning and Scheduling Data Header. When the “Scheduling Mode” field is set to “ANALYSIS”, the activities are checked for constraints only (i.e, the EOC master schedule is not modified) and the analysis results data format is the same as the SCHEDULE data format (with Scheduling Mode = ANALYSIS).

Note: “Late change” ODSs received after the FOT has locked the Detailed Activity Schedule are automatically processed as “ANALYSIS”. The FOT may apply the “Late Change” ODS to the EOC master schedule after verification that the ODS will result in a conflict-free Detailed Activity Schedule. If the late change ODS is applied to the Master Schedule, the IOT will be notified by automated ftp of the new detailed schedule (DAS). If the late change ODS is not applied to the Master Schedule the FOT will notify the IOT either verbally or via e-mail. In either case, the Late Change ODS submission does not result in the generation of an ACS.

```
STS1999003001ASTEOCAM1ASTSCHEDULE48199902400000019990722359590 1ASTER
00000009
#This example shows the layout of sample records within an ASTER Short Term
Schedule
#The following record is a sample Data Base Defined Activity Record scheduled
by absolute time.
ACTABSASTER                                                    TIR_ACTIVITY_A
1234567
                                                1 999024013015
1999024013115               0 000
#The following records are an example of a Data Base Defined Activity
scheduled by orbital event (EVT), #including DAR ID records.
ACTEVTASTER                                                   VNIR1_ACTIVITY_Z
1234570
Node_Ascending                  0001222201-0200               Node_Ascending
0001222201+0700
                            0006
DARASTER_DAR_ID_22334455,ASTER_DAR_ID66497358,ASTER_DAR_ID_94329764,ASTER_DAR_
ID_56977777,ASTER_DAR_ID_65034674,
DARASTER_DAR_ID_00000001
#The following records are another example of a data base defined activity
scheduled by orbital event (EVT), #including Activity, Parameter Records and a
DAR ID record.
ACTEVTASTER                                                   SWIR_ACTIVITY_XYZ
1234571
Node_Descending  0001222201-0200                              Node_Descending
0001222201+0700
                            0401
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_1=PARAMETER_VALUE,CMD_MNEMONIC_1[1]/PARAMET
ER_NAME_2=PARAMETER_VALUE,
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_3=PARAMETER_VALUE,CMD_MNEMONIC_2[2]/PARAMET
ER_NAME_1=PARAMETER_VALUE
DARASTER_DAR_ID_000008001
#
#
#Without the comment records, the STS records in the above examples would
appear as:
STS1999003001ASTEOCAM1ASTSCHEDULE48199902400000019990722359590 1ASTER
00000009
ACTABSASTER                                                    TIR_ACTIVITY_A
1234567
```

```
                                                1 999024013015
1999024013115               0 000
ACTEVTASTER                                                  V NIR1_ACTIVITY_Z
1234570
Node_Ascending                     0001222201-0200              Node_Ascending
0001222201+0700
                             0006
DARASTER_DAR_ID_22334455,ASTER_DAR_ID66497358,ASTER_DAR_ID_94329764,ASTER_DAR_
ID_56977777,ASTER_DAR_ID_65034674,
DARASTER_DAR_ID_00000001
ACTEVTASTER                                                S WIR_ACTIVITY_XYZ
1234571
Node_Descending  0001222201-0200                             Node_Descending
0001222201+0700
                             0401
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_1=PARAMETER_VALUE,CMD_MNEMONIC_1[1]/PARAMET
ER_NAME_2=PARAMETER_VALUE,
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_3=PARAMETER_VALUE,CMD_MNEMONIC_2[2]/PARAMET
ER_NAME_1=PARAMETER_VALUE
DARASTER_DAR_ID_000008001
```

Figure 3-2. Sample Short Term Schedule File Layout

Table 3-6. One Day Schedule Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted, the scheduling mode, and the time frame covered by the ODS	ASCII (variable)	See Table 3-3
Activity Records, Parameter Records, DAR ID Records (DAR), Comment Records.	One Day Schedule Data.	ASCII (variable)	See Tables 3-9 through 3-11 and 3-15

3.5.2 Detailed Data Description

The ODS is described in Table 3-6. Refer to Section 3.8 for actual formats of the ODS data records.

The Planning and Scheduling Data Header is the first record of the ODS. The Planning and Scheduling Data Header specifies the Scheduling Mode of the ODS as well as the Start Time and Stop Time of the activities included in the ODS.

The Planning and Scheduling Data Header is followed by a list of Activity Records, Parameter Records, DAR ID Records, and Comment Records The ODS contains Activity Records for valid Data Base Defined Activities only. If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters.

If an ASTER activity specifies that the number of DAR IDs is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s).

Comment Records may be inserted anywhere in the ODS after the Planning and Scheduling Data Header, except between an Activity Record and its associated Parameter Record(s) or DAR ID Record(s).

3.6 Activity Schedule

3.6.1 General

The Activity Schedule is provided via FTP by the EOC to the ECS ICC. The purpose of the Activity Schedule is to provide the IOT with the EOC schedule of activities, including TDRSS contact activities, after receipt and processing of the ODS (unless the ODS was a Late Change – see Section 3.1.2 for details).

3.6.2 Detailed Data Description

The Activity Schedule is described in Table 3-7. The Planning and Scheduling Data Header is the first record of the Activity Schedule. The Planning and Scheduling Data Header specifies the Scheduling Mode of the Activity Schedule as well as the Start Time and Stop Time of the activities included in the Activity Schedule. An Activity Schedule with Scheduling Mode = SCHEDULE is sent in response to a ODS with Scheduling Mode = SCHEDULE (unless the ODS was a Late Change – see Section 3.1.2 for details). An Activity Schedule with Scheduling Mode = ANALYSIS is sent in response to a ODS with Scheduling Mode = ANALYSIS.

The Planning and Scheduling Data Header is followed by a list of Activity Records, Parameter Records, DAR ID Records, Mode Records, and Constraint Records. The Activity Records (with their associated Parameter Records and DAR ID Records) appear first, followed by Mode Records, then Constraint Records.

```
PRS1999003034EOCASTAM1ASTSCHEDULE4819990240000001999072235959000000134 2
ACTEVTCERES                                                  CERES-ACTIVITY-12354
87656787
S/C_Night/Day                        0001117401+00001999024000000S/C_Day/Night
0001117401+0130
1999024004745               0 000
ACTABSMODIS                                                MODIS_ACTIVITY_676
81234589
                       1999024000015
1999024000115               0 000
ACTABSASTER                                                  TIR_ACTIVITY_A
123456778654389
                       1999024013015
199902401311500010.00100.00000000
ACTEVTASTER                                                 VNIR1_ACTIVITY_Z
123457078655400
Node_Ascending                     0001222201-020019990300245 30Node_Ascending
0001222201+0700
199903002543000007.50050.00000006
DARASTER_DAR_ID_22334455,ASTER_DAR_ID66497358,ASTER_DAR_ID_94329764,ASTER_DAR_
ID_56977777,ASTER_DAR_ID_65034674,
DARASTER_DAR_ID_00000001
ACTABSAM1                                                    T DRSS-CONTACT
46474888
                       1999030024645
1999030025645               0 000
ACTEVTASTER                                                S WIR_ACTIVITY_XYZ
123457078685400
Node_Descending                  0 001222201-020019990300145 00Node_Descending
0001222201+0700
1999030014700               0 401
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_1=PARAMETER_VALUE,CMD_MNEMONIC_1[1]/PARAMET
ER_NAME_2=PARAMETER_VALUE,
PRMCMD_MNEMONIC_1[1]PARAMETER_NAME_3=PARAMETER_VALUE,CMD_MNEMONIC_2[2]/PARAMET
ER_NAME_1=PARAMETER_VALUE
DARASTER_DAR_ID_000008001
MODCERES                                                          STDBY
199902416400019990241659000001 5.00
000.0000
```

```
MODCERES                                                        S OLARCAL
19990241659001999024230000000015.00
000.0000
MODCERES                                                         B IAXIAL
1999024230000                                                   00045.00
000.0009
CONMODIS                                                      M OD_ACTIVITY_X
86344617
MOPITT                                                      MOP_ACTIVITY_XYZ
998765671999026013025
1999026013030026S
```

Figure 3-3. Sample Preliminary Resource Schedule File Layout

Activity Records appear in ascending start time order. If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters.

If an ASTER Activity Record specifies that the number of DAR IDs is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s).

Mode Records appear in ascending instrument mode time order. The mode characterizes an instrument or subsystem's operational state. Mode Records are generated by the EMOS as a result of scheduling activities into the mission plan.

Mode Records are followed by a listing of Constraint Records. Constraint Records appear in ascending constraint start time order. Constraint Records appear as needed to identify errors with the input file (the ODS), as well as scheduling constraint violations against a scheduled activity. Scheduling constraints are identified as either "hard" or "soft" constraints. Hard constraints must be resolved prior to generation of the Detailed Activity Schedule (see Section 4 for timeline information).

Table 3-7. Activity Schedule Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted, the scheduling mode, and the time frame covered by the Activity Schedule.	ASCII (variable)	See Table 3-3
Activity Records, Parameter Records, DAR ID Records(ASTER), Mode Records, and Constraint Records.	Activity Schedule Data.	ASCII (variable)	See Tables 3-9 through 3-13 and 3-15

3.7 Detailed Activity Schedule (DAS)

3.7.1 General

The Detailed Activity Schedule is automatically sent to the ECS ICCs identified in Tables 3-1 and 3-2. The purpose of the DAS is to provide the IOT with the conflict-free schedule that is used by the EOC to generate the AM-1 Spacecraft Control Computer (SCC) stored command loads and ground script. The DAS for a target day becomes available at the ECS IST when the DAS is generated for the EOC to prepare the operations day products (ground script and command loads). The DAS contains activities for all AM-1 subsystems and instruments, including TDRSS contact activities.

3.7.2 Detailed Data Description

The DAS is described in Table 3-8. Refer to Section 3.8 for actual formats of the DAS data records. An example DAS is included in Appendix B.

The Planning and Scheduling Data Header is the first record of the DAS. The Scheduling Mode of the DAS, as defined in the Planning and Scheduling Data Header, is always set to "SCHEDULE". The Planning and Scheduling Data Header also identifies the earliest start time and latest start time of the activities included in the DAS (in the Start Time and Stop Time fields).

The Planning and Scheduling Data Header is followed by a list of Activity Records, Parameter Records, ASTER DAR ID Records, Mode Records, and Constraint Records. The Activity Records with their associated Parameter Records (and ASTER DAR ID Records) appear first, followed by Mode Records, then Constraint Records.

Activity Records appear in ascending start time order. If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters.

If an Activity Record specifies that the number of DAR IDs is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR

IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s).

Table 3-8. Detailed Activity Schedule Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted, the scheduling mode, and the time frame covered by the Detailed Activity Schedule. For Detailed Activity Schedule messages, the scheduling mode field is always = "SCHEDULE".	ASCII (variable)	See Table 3-3
Activity Records, Parameter Records, DAR ID Records (ASTER), Mode Records, and Constraint Records.	Detailed Activity Schedule Data.	ASCII (variable)	See Tables 3-9 through 3-13 and 3-15

Mode Records appear in ascending instrument mode time order. The mode characterizes an instrument or subsystem's operational state. Mode Records are generated by EMOS as a result of scheduling activities into the mission plan.

Mode Records are followed by a listing of Constraint Records. Constraint Records appear in ascending constraint start time order. Constraint Records appear as needed to identify soft constraint violations between activities. Activities with hard constraint violations must be resolved prior to generation of the Detailed Activity Schedule, therefore hard constraint violations will not appear in the Detailed Activity Schedule Constraint Records.

3.8 Schedule Data Record Formats

3.8.1 Activity Records

The EOC performs scheduling of spacecraft and instrument operations through the use of data constructs called activities. Planning and Scheduling inputs (e.g., the STS and ODS) and the resulting EOC schedules (e.g., Preliminary Resource Schedule, Activity Schedule, and Detailed Activity Schedule) include lists of Activity Records which describe planned and scheduled spacecraft and instrument operations.

Data Base Defined Activities are applicable for any of the AM-1 instruments or subsystems. Data Base Defined Activities reference pre-defined, pre-validated, configuration-controlled activities that are stored in the EOC Data Base. A Data Base Defined Activity that does not have any commands associated with it is called a Label Activity. Label Activities may be used to annotate events.

Data Base Defined Activities may be scheduled with respect to Absolute Time or Orbit Events. Appendix A is a list of representative scheduling Orbit Events. The MMS allows user-defined dynamic orbit events, so this is simply a sample list. The desired scheduling method for each activity is identified by the "Scheduling Type" field (ABS or EVT) of the Activity Record. The Activity Record is described in Table 3-9. Refer to Figures 3-2 and 3-3 or Appendix B for examples of Activity Records.

3.8.2 Parameter Records

If an Activity Record specifies that the number of parameters is greater than zero, then the Activity Record is immediately followed by one or more Parameter Records identifying all of the necessary parameters. If all of the required parameter specifications do not fit within a single Parameter Record, additional Parameter Records are used. The number of Parameter specifications must equal the Number of Parameters field from the Activity Record. A Parameter specification (mnemonic/parameter name = value) cannot be split across different Parameter Records. If a given mnemonic/parameter name occurs multiple times in the Activity definition, then a Parameter specification must include the command occurrence number of the command mnemonic whose parameter is being specified. Command occurrence numbers are assigned sequentially within an activity definition beginning with 1. The Parameter Record is described in Table 3-10. Refer to Figures 3-2 and 3-3 or Appendix B for examples of Parameter Records.

Table 3-9. Activity Record Format (1 of 5)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Record Type	Indicates that this is an Activity Record	ASCII (3 B)	ACT	ACT
Scheduling Type	Indicates the type of scheduling used for the activity (i.e., absolute time or event-based)	ASCII (3 B)	ABS: schedule based on absolute time EVT: schedule as an offset from a scheduling event	ABS: scheduled based on absolute time EVT: scheduled as an offset from a scheduling event
Activity Resource Name	Identifies the scheduling resource upon which the activity is scheduled. The STS and ODS will only contain activities for instrument scheduling resources.	ASCII (40 B)	Any valid scheduling resource. The list of valid resources is controlled by the FOT.	The resource on which the activity is scheduled.
Activity Name	Identifies the activity definition name in the EOC data base	ASCII (40 B)	Any valid activity name.The set of valid activities is controlled by the FOT.	The name of the scheduled activity.
Activity ID	An integer value that uniquely identifies this activity. The ID is formatted as "nnnnnnn", where "nnnnnnn" is a unique number assigned to this activity by the ICC.	ASCII (7 B)	nnnnnnn: 0000000 - 9999999	–Same as input Activity ID if activity was scheduled with Filter Scheduler, otherwise filled with ASCII blanks.
EOC Activity ID	An integer value that uniquely identifies this activity. The ID is formatted as "nnnnnnnn", where "nnnnnnnn" is a unique number assigned to this activity by the EOC when the activity is defined. The EOC Activity ID is used for coordination between the STS-Preliminary ResourceDefined and ODS-Activity Schedule. For STS and ODS, this field is filled with ASCII blanks.	ASCII (8 B)	–ASCII blanks.	nnnnnnnn: 00000000 - 99999999

Table 3-9. Activity Record Format (2 of 5)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Start Event	The Start Event identifies the scheduling event on which the reference activity "START" point (as defined in the activity definition in the data base) is based. Note: The reference activity "START" is not necessarily equal to the execution time of the first command in the activity. The Start Event is specified as EVENT ORBIT SEQNO, where EVENT represents a mnemonic for a valid scheduling event (fixed length 32 characters); ORBIT represents the orbit number (fixed length 8 digits, as defined in FDF planning aids); and SEQNO represents the sequential number of the event in the specified orbit (fixed length 2 digits). For those events that occur only once in an orbit, the SEQNO is always "01". This field is filled with ASCII blanks when Scheduling Type = ABS.	ASCII (42 B)	EVENT: (see Appendix A) ORBIT: 00000000 - 99999999 SEQNO: 01 – 99	EVENT: (see Appendix A) ORBIT: 00000000 - 99999999 SEQNO: 01 - 99
Start Event Delta	The Start Event Delta is represented by a sign (+ or -) and "mmss" to indicate the time (minutes and seconds) offset from the Start Event on which the activity is scheduled. This field is filled with ASCII blanks when Scheduling Type = ABS. A zero delta is represented as “+0000”.	ASCII (5 B)	sign: + or - mm: 00 – 99 ss: 00 – 59	sign: + or - mm: 00 - 99 ss: 00 - 59

Table 3-9. Activity Record Format (3 of 5)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Activity Start Time	The Activity Start Time specifies the reference activity "START" point (as defined in the activity definition in the data base) for this activity. Note: The reference activity "START" is not necessarily equal to the execution time of the first command in the activity. The ICC may insert either blanks or a computed reference activity "START" Time for activities which are scheduled based on events. For activities which are scheduled based on events, EOC will overwrite this field with the most accurate computed reference activity "START" Time based on the latest FDF predicts. The start time will be in the following format: yyyydddhhmmss.	ASCII (13 B)	yyyy: 1995 – 2100 ddd: 001 – 366 hh: 00 – 23 mm: 00 – 59 ss: 00 - 59	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59
Stop Event	The Stop Event identifies the scheduling event on which the reference activity "STOP" point (as defined in the activity definition in the data base) is based. Note: The reference activity "STOP" is not necessarily equal to the execution time of the last command in the activity. The Stop Event is specified in the same format as the Start Event. This field is filled with ASCII blanks when Scheduling Type = ABS. This field is filled with ASCII blanks when the data base definition for this activity does not have a reference "STOP" point.	ASCII (42 B)	EVENT: (see Appendix A) ORBIT: 00000000 - 99999999 SEQNO: 01 - 99	EVENT: (see Appendix A) ORBIT: 00000000 - 99999999 SEQNO: 01 – 99
Stop Event Delta	The Stop Event Delta is represented by a sign (+ or -) and "mmss" to indicate the time (minutes and seconds) offset from the Stop Event on which the activity stop time is scheduled. This field is filled with ASCII blanks when Scheduling Type = ABS. A zero delta is represented as “+0000”.	ASCII (5 B)	sign: + or - mm: 00 - 99 ss: 00 - 59	sign: + or - mm: 00 - 99 ss: 00 - 59

Table 3-9. Activity Record Format (4 of 5)

Field	Description	Type (Length in Bytes)	ICC Input Values	EOC or IST Output Values
Activity Stop Time	The Activity Stop Time specifies the reference activity "STOP" point (as defined in the activity definition in the data base) for this activity. Note: The reference activity "STOP" is not necessarily equal to the execution time of the last command in the activity. The ICC may insert either blanks or a computed reference activity "STOP" Time for activities which are scheduled based on events. For activities scheduled based on events, EOC will overwrite this field with the most accurate computed reference activity "STOP" Time based on the latest FDF predicts. The stop time will be in the following format: yyyydddhhmmss. NOTE: If no stop time is specified in any of the stop fields (Stop Event or Activity Stop Time), then the activity will be scheduled using the database defined default duration for the activity. If there is no database defined default duration, then the minimum possible duration for the activity will be used.	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 – 59
Start Pointing Angle	For Data Base Defined Activities for Slewing, the start pointing angle is expressed as a sign (+ or -) and degrees. The pointing angle is expressed as the cross-track angular value, where +0000.00 represents nadir pointing. For non-slewing data base defined activities, the STS and ODS may contain ASCII blanks for this field, which will result in a default pointing angle of +0000.00 being used	ASCII (8 B)	-0180.00 - +0180.00 (Start Pointing Angle, as defined by the slew angle with reference to the AM-1 spacecraft Y-axis, as defined in the spacecraft coordinate system.) NOTE: ASCII blanks will result in a value of +0000.00 being used.	Start Pointing Angle from the input file if this activity was scheduled using the Filter Scheduler, otherwise filled with ASCII blanks.

Table 3-9. Activity Record Format (5 of 5)

Field	Description	Type (Length in Bytes)	Input Values	Output Values
Stop Pointing Angle (Data Base Defined Activities for Slewing)	For Data Base Defined Activities for Slewing, the stop pointing angle is expressed as a sign (+ or -) and degrees. The pointing angle is expressed as the cross-track angular value, where +0000.00 represents nadir pointing. For non-slewing data base defined activities, the STS and ODS may contain ASCII blanks for this field, which will result in a default pointing angle of +0000.00 being used.	ASCII (8 B)	-0180.00 - +0180.00 (Stop Pointing Angle, as defined by the slew angle with reference to the AM-1 spacecraft Y-axis, as defined in the spacecraft coordinate system.) NOTE: ASCII blanks will result in a value of +0000.00 being used.	Start Pointing Angle from the input file if this activity was scheduled using the Filter Scheduler, otherwise filled with ASCII blanks.
Number of Parameters	Identifies the number of user-specified parameters associated with this activity. If there are no user-specified parameters associated with this activity, the value must be "00".	ASCII (2 B)	00 - 99	00 - 99
Number of DAR IDs	Specifies the number of DARs associated with this activity. If there are no DARs associated with this activity, the value must be “00”.	ASCII (2 B)	00 - 99	00 - 99
Record Terminator	Identifies the end of this Activity Record	ASCII (1 B)	\n (new line character)	\n (new line character)

Table 3-10. Parameter Record Format

Field	Description	Type (Length in Bytes)	Values
Record Type	Indicates that this is a Parameter Record.	ASCII (3 B)	PRM
Parameter List	Listing of Parameters (separated by commas) associated with the previous activity record. Each parameter specification is expressed as: command mnemonic [CMD#][1] /parameter name = value.	ASCII (<= 154 B)	Parameter Specifications in the format: "Command Mnemonic [CMD #] /Parameter Name = Value", where Command Mnemonic is a valid activity command mnemonic in the EOC data base and Parameter Name is a valid parameter name in the EOC data base for the referenced command mnemonic. Valid Command Mnemonics and Parameter Names (Command Subfields) are defined in the EOS AM-1 Project Data Base.
Record Terminator	Identifies the end of the Parameter Record	ASCII (1 B)	\n (new line character)

[1]The command occurrence number is required for a command whose parameter is being modified, because the referenced command mnemonic may appear more than once within an activity definition. Commands are numbered sequentially in an activity definition, beginning with 1. The command occurrence number reference will be entered as [5], for example, to specify the fifth command mnemonic in the activity definition.

3.8.3 ASTER DAR ID Records

If an Activity Record specifies that the number of DAR IDs is greater than zero, then the Activity Record is followed by one or more DAR ID records identifying all of the relevant DAR IDs. If an Activity Record specifies both parameters and DAR IDs, the Parameter Record(s) appear first, followed by the DAR ID record(s). If all of the required DAR IDs do not fit within a single DAR ID Record, additional DAR ID Records are used. DAR IDs are not split across different DAR ID Records. The DAR ID Record is described in Table 3-11. Refer to Figures 3-2 and 3-3 for examples of DAR ID Records.

Table 3-11. ASTER DAR ID Record

Field	Description	Type (Length in Bytes)	Values
Record Type	Indicates that this is a DAR ID Record.	ASCII (3 B)	DAR
DAR ID List	Listing of DAR IDs associated with the previous activity record. DAR IDs are separated by commas.	ASCII (<=154 B)	As determined by ASTER GDS
Record Terminator	Identifies the end of the DAR ID Record	ASCII (1 B)	\n (new line character)

3.8.4 Mode Records

Mode records give operational states of instruments and spacecraft subsystems. Commanding within activities which are scheduled into the mission plan cause instruments and subsystems to transition into various modes. Usually modes are associated with power and data rate information which can be found in the activity definition data base. Mode records will contain a mode name, instrument or subsystem associated with the mode change, power, data rate and the start and stop time of the mode. The Mode Record format is described in Table 3-12. Refer to Figure 3-2 for examples of Mode Records.

3.8.5 Constraint Records

Constraint information is included in Preliminary Resource Schedules, Activity Schedules, and Detailed Activity Schedules. The purpose of the constraint information is to both document errors in input to the Filter Scheduler, and provide detailed information pertaining to scheduling constraint violations and error conditions. The constraint information includes constraint violations for all instruments and spacecraft subsystem activities. If the activity is constrained by more than one activity, a separate Constraint Record is provided for each violation. Input errors, however, will only report the first error encountered (processing of a record halts as soon as an input error is detected). The Constraint Record is described in Table 3-13. Refer to Figure 3-3 for examples of Constraint Records.

3.8.6 Comment Records

Comment records are optional and may be included in STS or ODS. Comment records are not contained in the Preliminary Resource Schedule, Activity Schedule, or Detailed Activity Schedule. Comment Records are used for annotation only; these records are not processed by the EOC scheduling software. The Comment Record is described in Table 3-15. Refer to Figure 3-2 for examples of Comment Records.

3.9 Request for EOC Schedules

3.9.1 General

The IOT sends a Request for EOC Schedules via the ECS IST. The purpose of the Request for EOC Schedules is to obtain a report of a particular portion of the integrated EOC master schedule. This integrated schedule will be an Activity Schedule containing activity schedule data for all EOS AM-1 subsystems and instruments for the time frame specified in the Planning and Scheduling Data Header.

Table 3-12. Mode Record Format (1 of 2)

Field	Description	Type (Length in Bytes)	Values
Record Type	Indicates that this is a Mode Record	ASCII (3 B)	MOD: indicates a Mode Record
Mode Resource Name	Identifies the scheduling resource with which the mode is associated. Valid instrument/ subsystem names are defined in the EOS AM-1 Project Data Base.	ASCII (40 B)	Any valid resource name. The list of valid resources is controlled by the FOT.
Mode name	New Mode name as defined in the EOS AM-1 Project Data Base.	ASCII (30B)	Any valid mode name. The list of valid mode names is controlled by the FOT.
Mode Start Time	The Mode Start Time specifies the Start Time of this mode. The start time will be in the following format: yyyydddhhmmss.	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59

Table 3-12. Mode Record Format (2 of 2)

Field	Description	Type (Length in Bytes)	Values
Mode Stop Time	The Mode Stop Time specifies the Stop Time of this mode. The stop time will be in the following format: yyyydddhhmmss. For contiguous mode records, the stop time of the previous record will be the same as the start time of the next record. If this is the last record in the list, the stop time field may be blank, indicating that the instrument or subsystem remains in the most recently scheduled mode.	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59
Average Power	The average power specifies the average number of watts consumed during the mode.	ASCII (8 B)	00000.00 - 99999.99 (Power)
Data Rate	The data rate specifies the average rate at which data is being stored in the buffer during the mode. The data rate is specified in units of MBits/second.	ASCII (8 B)	000.0000 - 999.9999 (Data Rate)
Record Terminator	Identifies the end of this Mode Record	ASCII (1 B)	\n (new line character)

Table 3-13. Constraint Record (1 of 3)

Field	Description	Type (Length in Bytes)	Values
Record Type	Indicates that this is a Constraint Record	ASCII (3 B)	CON: indicates a Constraint Record
Resource Name	Identifies the scheduling resource upon which the constraint is detected. Valid resource names are defined in the EOS AM-1 Project Data Base.	ASCII (40 B)	Valid resource name if this is a scheduling constraint on a resource, otherwise filled with ASCII blanks.
Activity Name	Identifies the activity name of the activity involved in the constraint violation.	ASCII (40 B)	Valid activity name if this is a scheduling constraint involving an activity, otherwise filled with ASCII blanks. For scheduling constraints related to consumables (power, data volume), this field is filled with blanks.
EOC Activity ID	An integer value that uniquely identifies the activity that is under constraint. The ID is formatted as "nnnnnnnn", where "nnnnnnnn" is a unique number assigned to this activity by the EOC when the activity is defined. Note: In those cases where an activity is not scheduled (Constraint Flag = E), this field will contain blanks.	ASCII (8 B)	–Valid EOC activity ID if this is a scheduling constraint involving an activity, otherwise filled with ASCII blanks. For scheduling constraints related to consumables (power, data volume), this field is filled with blanks.
Constraining Resource Name	Identifies the scheduling resource with which the activity is constrained. Valid resource names are defined in the EOS AM-1 Project Data Base.	ASCII (40 B)	Valid resource name if this is a scheduling constraint involving an activity, otherwise filled with ASCII blanks. For scheduling constraints related to consumables (power, data volume), this field is filled with blanks.
Constraining Activity Name	Identifies the activity name of the activity involved in the constraint violation.	ASCII (40 B)	Valid activity name if this is a scheduling constraint caused by conflict between two activities, otherwise filled with ASCII blanks. For scheduling constraints related to consumables (power, data volume), this field is filled with blanks.
Constraining EOC Activity ID	An integer value that uniquely identifies the activity that is causing the constraint. The ID is formatted as "nnnnnnnn", where "nnnnnnnn" is a unique number assigned to this activity by the EOC when the activity is scheduled. Note: If the constraint is not directly caused by another activity, this field is filled with blanks.	ASCII (8 B)	Valid EOC activity ID (nnnnnnnn: 00000000 – 99999999) if this is a scheduling constraint caused by conflict between two activities, otherwise filled with ASCII blanks. For scheduling constraints related to consumables (power, data volume), this field is filled with blanks.

Table 3-13. Constraint Record (2 of 3)

Field	Description	Type (Length in Bytes)	Values
Constraint Start Time	The constraint start time identifies the time the constraint violation begins. The constraint start time will be identified with the following format: yyyydddhhmmss. For constraints related to consumables (power and data volume), if the constraint start time occurs at a time that is equal to or prior to the Scheduling Data Header "Schedule Start Time", this field will be equal to the "Schedule Start Time".	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 – 59 The start time of this scheduling constraint. If this is not a scheduling constraint, this field will be filled with ASCII blanks.
Constraint Stop Time	The constraint stop time identifies the time the constraint violation ends. The constraint stop time will be identified with the following format: yyyydddhhmmss. For constraints related to consumables (power and data volume), if the constraint stop time occurs at a time that is equal to or after the Scheduling Data Header "Schedule Stop Time", this field will be equal to the "Schedule Stop Time".	ASCII (13 B)	yyyy: 1995 - 2100 ddd: 001 - 366 hh: 00 - 23 mm: 00 - 59 ss: 00 - 59 The stop time of this scheduling constraint. If this is not a scheduling constraint, this field will be filled with ASCII blanks.
Flag and Error/Constraint Code	The flag & error/constraint code provides information that describes the error or constraint violation. The format of the flag & error/constraint code is "Fnn", where "F" = the flag and "nn" is a valid error/constraint code. Valid flags and error/constraint codes are in Table 3-12.	ASCII (3 B)	See Table 3-14 NOTE: F class errors indicate a fatal file processing error with the input file – no records were processed from the input. E class errors indicate a non-fatal file processing error with one or more records in the input file – this means that no activity was scheduled as a result of processing this record(s). W class errors indicate that the record was processed correctly and an activity was scheduled, but the scheduled activity caused a scheduling constraint, which is being reported in this constraint record.

Table 3-13. Constraint Record (3 of 3)

Field	Description	Type (Length in Bytes)	Values
Constraint Type	The constraint type specifies if the constraint is a “hard” or “soft” constraint. Hard constraints must be resolved prior to generation of the Detailed Activity Schedule	ASCII (1B)	H = hard constraint S = soft constraint, only valid with a scheduling constraint. Otherwise filled with an ASCII blank.
Record Terminator	Identifies the end of this Constraint Record	ASCII (1 B)	\n (new line character)

Table 3-14. Error/Constraint Codes (1 of 2)

Flag	Error/Constraint Code	Explanation
		Planning and Scheduling File Errors
F	01	Unrecognized file. File name does not comply with file naming convention (not used)
F	02	Duplicate file name. A unique file name was not provided, as required by the file naming convention
	03 - 09	Spare
		Planning and Scheduling Data Header Errors
F	10	Invalid value in Message Type field
F	11	Invalid Source
F	12	Invalid Destination
F	13	Invalid Spacecraft Name
	14	Spare
F	15	Invalid Scheduling Mode
F	16	Invalid Number of Days in File
F	17	Invalid/Unrecognized Time for Schedule Start Time or Schedule Stop Time
F	18	Stop time is earlier than Start time
F	19	Incomplete file (File contents do not match Number of Records in the Planning and Scheduling Data Header)
F	20	Invalid Number of Resources
F	21	Invalid Resource Name in Scheduling Resource list
F	22	Invalid number of records (i.e., not an integer)
F	23	Unauthorized Resource Name in Scheduling Resource List
	24-35	Spare
		Scheduling Record Errors
E	36	Invalid Scheduling Record Type
E	37	Invalid Instrument/Subsystem Name
E	38	Activity Name not found in PDB
E	39	Invalid Activity ID
E	40	Invalid Orbit Event
E	41	Activity could not be scheduled. FDF orbit event data unavailable.
E	42	Invalid Orbit/Sequence Number
E	43	Invalid Delta Time

Table 3-14. Error/Constraint Codes (2 of 2)

Flag	Error/Constraint Code	Explanation
E	44	Invalid Resource Value (Power, Data Rate, Pointing Angle)
E	45	Number of Parameters in Activity Record does not match the number of parameters provided in the corresponding Parameter Record
E	46	Number of DAR IDs in Activity Record does not match DAR ID Record
E	47	Unrecognized parameter names (command mnemonic/parameter name or command submnemonic/parameter name)
E	48	Invalid Value specified for parameter
E	49	Missing Parameter (a parameter has not been specified and a default value has not been specified in the Activity definition)
E	50	Invalid Start Time. The start time does not fall within the start/stop range specified in the Planning and Scheduling Header
E	51	User not authorized to schedule this Activity Name
E	52	Activity attempts to modify a non-modifiable parameter
E	53	Invalid/Unrecognized start or stop time
E	54	Activity duration is less than the minimum duration defined in the PDB
	55-65	Spare
		Scheduling Constraint Violations
W	66	Power consumption constraint exceeded
W	67	Data volume constraint exceeded
W	68	Activity prerequisite condition not met (e.g., entry mode violation)
W	69	Constraint violation exists between 2 activities
W	70	Constraint violation exists between activity and orbit event
	71 - 99	Spare

Explanation of Flags:
F = Error; File not processed
E = Error; Activity Record was not processed
W = Warning only; Activity Record was processed

Table 3-15. Comment Record Format

Field	Description	Type (Length in Bytes)	Values
Record Type	Indicates that this is a Comment Record. A comment record is identified by an ASCII "#" in column 1 of the record.	ASCII (1 B)	#
Comment Text	User-defined comment text.	ASCII (<=154 B)	ASCII text
Record Terminator	Identifies the end of the Comment Record	ASCII (1 B)	\n (new line character)

3.9.2 Detailed Data Description

The Request for EOC Schedules is described in Table 3-16. The Planning and Scheduling Data Header is the only record of the Request for EOC Schedules.

Table 3-16. Request for EOC Schedules Format

Field	Description	Type (Length in Bytes)	Values
Planning and Scheduling Data Header	Identifies the type of message being transmitted (REQ) and the time frame covered by the requested EOC schedule data. For Request for EOC Schedules messages, the scheduling mode field will always = “SCHEDULE”.	ASCII (variable)	See Table 3-3

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4. Detailed Activity Schedule Timelines and Operations

This section documents the operations rules governing the Detailed Activity Schedule (DAS) generated by the Terra/AM-1 Mission Management System (MMS). General information about the routine daily operations timeline and processes are documented in the Mission Management System section of the EMOS System Operations and Maintenance (O&M) Manual.

4.1 DAS Period

Each DAS generated is for a fixed period of time identified by the start time and stop time in the file header. The following characteristics of the DAS are important to the operations concept:

- Each DAS is uniquely identified by the start time and stop time in the file header. Thus, the period of each DAS is established permanently at the time the initial DAS is created.
- If a DAS is updated, there is no change in the start time or stop time of the updated file, but the Message ID in the header uniquely distinguishes the updated file from the initial DAS or other updates.
- The periods of adjacent DAS's are contiguous; that is, a new DAS begins at the time the last DAS ended and there is never a gap or an overlap.
- The MMS software supports DAS's of differing lengths.

Thus, if the initial DAS is for 24 hours from 20:00Z to 20:00Z, all subsequent updates to that DAS will be for 24 hours from 20:00Z to 20:00Z. If the initial DAS is for 10 hours from 20:00Z to 06:00Z, all updates will be for 10 hours from 20:00Z to 06:00Z.

The nominal Terra/AM-1 DAS period coincides with the mission operational day. The operational day is 24 hours from 20:00Z to 20:00Z on the following day (see Figure 4-1). The Terra/AM-1 FOT anticipates no deviations from the nominal 24 hour, operational day plan unless an emergency or spacecraft anomaly occurs (see Section 4.3). Even then, a DAS period of less than several hours is extremely unlikely. However, shorter periods cannot be ruled out absolutely because MMS software supports any period length.

4.2 Nominal DAS Schedule and Procedures

4.2.1 Initial DAS and ATC Load

An ATC Load is generated each time a DAS is created.

Generation of the initial DAS file begins by 17:00Z, 27 hours before the start of the operational day (reference Figure 4-1). The DAS is delivered by 19:00Z.

Every DAS file created is automatically sent via ftp to designated users by the MMS even though the corresponding ATC Loads may *not* get uplinked to the spacecraft. An example of this is when approved Late Changes supercede the previously generated DAS and ATC Load files. Then the initial ATC Loads are not uplinked.

Designated users are notified about each Load to be uplinked to the spacecraft via e-mail message from the FOT schedulers. The users can utilize the e-mail message to determine which DAS and other report files go with that particular Load. File naming convention and format of the DAS are documented in Section 3 of this White Paper.

4.2.2 DAS Updates; Late Changes

A change to a DAS that has already been issued is designated a "late change."A late change would usually be derived from an ASTER ODS or a spacecraft activity change by the FOT. The cutoff for receipt of late changes is 13:00Z. An update received for routine operations after the cutoff time is not processed.

When a late change has been accepted, an updated DAS is generated. An updated DAS is a complete replacement for the initial DAS. The updated DAS and ATC Load must be generated by 15:00Z for the Load to be uplinked to the spacecraft.

Whenever a late change is submitted, the FOT coordinates with all affected parties. An e-mail DAS notification is sent announcing issue of an updated DAS and ATC Load.

If a late change cannot be resolved and incorporated by 15:00Z, the change is denied.

Multiple DAS updates are possible, but it is unlikely that more than one ATC Load would be built.

Reasons for DAS updates include but are not limited to the following:

- Receipt of an updated scheduling file from an IOT.
- Scheduling conflicts with other instruments due to an update. IOTs are notified by the FOT and have to coordinate resolution.
- Rescheduling of activities by an instrument
- Changes to TDRSS contacts
- Updated activity or constraint definition applied to the system
- Updated FDS data

In most cases, an IOT would be aware of any updates that affect it. For any instrument, two types of updates are likely to affect an instrument or its production:

(1) An update requested by that instrument's IOT.

(2) Constraints on that instrument caused by a change(s) requested by another IOT. In that case, the IOT would be notified and would be involved in the resolution of the conflict.

Nevertheless, each team should have standard procedures to scan DAS updates for changes affecting its own instrument.

4.3 Deviations from the Nominal DAS Schedule

A variety of deviations from the nominal schedule are possible. DAS periods of less than 24 hours are technically possible and could be planned. Rarely, under special circumstances, the FOT might decide to waive the cutoff time for a late change and have the change processed. A spacecraft or instrument emergency could feasibly require that execution of the current ATC Load be stopped on-board via real-time commanding and that an update be issued during the operational day.

An operations concept for emergencies or other deviations from the nominal schedule and procedures has not been defined. The FOT reserves the right to plan a non-nominal DAS for resolution of critical situations. The FOT will coordinate resolution with the IOTS and keep all instrument teams informed of planning status.

In all cases, the updated DAS will adhere to the standard DAS format and will cover the entire relevant DAS period, no matter what time during the DAS period it is generated (see Section 4.1).

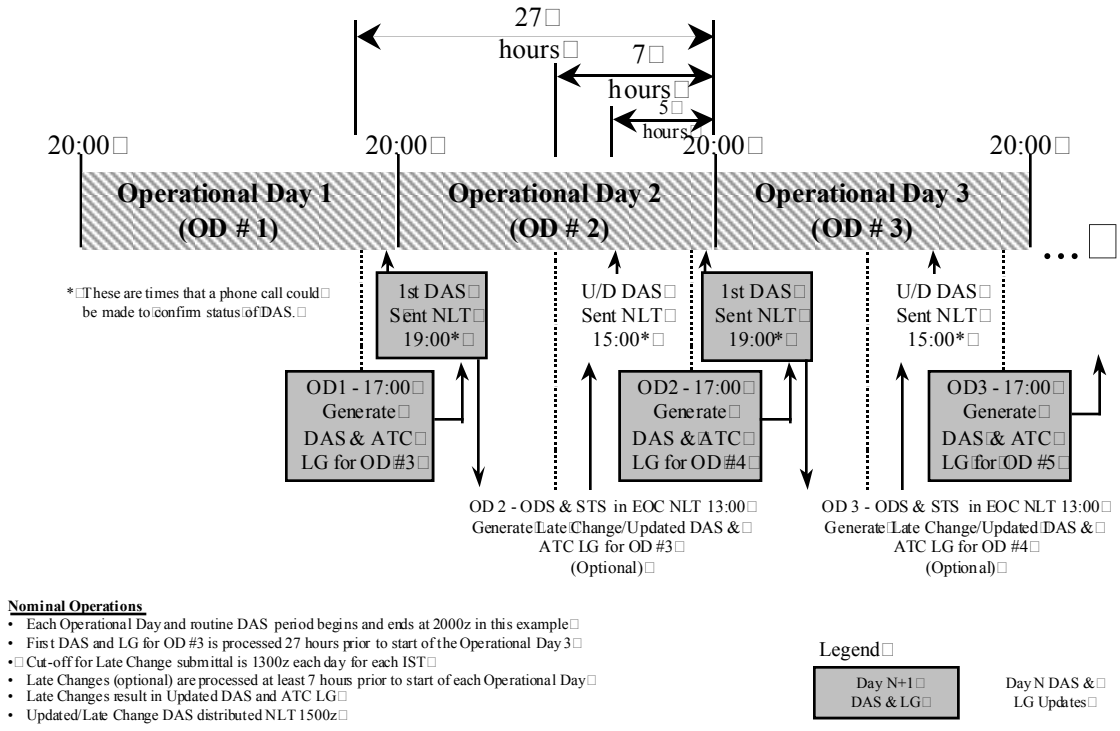

Figure 4-1. Nominal "Day-in-the Life" DAS and ATC Load Generation (LG) Concept

5. Parameters for EMOS-LaRC DAAC Operations Agreement

DAS files are delivered to the LaRC DAAC to support MISR processing. The following operations information is being held in this white paper pending an Operations Agreement for DAS file transfer between EMOS and the LaRC DAAC via ftp.

Data Server:

FTP IP Address:	198.118.217.10
Host Name:	lvicgaa.larcb.ecs.nasa.gov
User ID:	(Contact Jim Galasso, LaRC DAAC, (757) 864 - 9230)
Destination Directory:	/usr/ecs/OPS/CUSTOM/icl/a/data/pEMOS
Password:	(Contact Jim Galasso, LaRC DAAC, (757) 864 - 9230)

For operational issues, the LaRC DAAC Operations Controller can be

reached at:

Operations phone:	757-864-9197
Operations e-mail:	eos+ecs-ops@larc.nasa.gov

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Appendix A. Orbit Event Mnemonics

This table contains a representative set of orbit events. The list may change during the mission because IOTs can dynamically allocate orbit events at any time.

Event Mnemonic	Event Description
APOGEE	Apogee Event
CERES_Beta_Danger_Zone	CERES Beta Angle Danger Zone Event
CERES_Beta_Danger_Zone_End	CERES Beta Angle Danger End Event
CERES_Beta_Danger_Zone_Start	CERES Beta Angle Danger Start Event
CERES_Elev_Danger_Zone	CERES Elevation Angle Danger Event
CERES_Elev_Danger_Zone_End	CERES Elevation Angle Danger End Event
CERES_Elev_Danger_Zone_Start	CERES Elevation Angle Danger Start Event
CERES_Footprint_Tgt_Vis_Duration	CERES Target Visibility Exit for Baltimore Duration Event
CERES_Footprint_Tgt_Vis_Entry_Ba	CERES Target Visibility Entry for Baltimore Event
CERES_Footprint_Tgt_Vis_Exit_Bal	CERES Target Visibility Exit for Baltimore Event
CERES_Solar_Calibration	CERES Solar Calibration Event
Delta-V_Orbit_Maneuver	Delta-V Orbit Maneuver Event
HGA-TDRS_End_View_047	HGA-to-TDRS In View Stop
HGA-TDRS_End_View_TDE	HGA-to-TDRS In View Stop
HGA-TDRS_End_View_TDS	HGA-to-TDRS In View Stop
HGA-TDRS_End_View_TDW	HGA-to-TDRS In View Stop
HGA-TDRS_In_View_047	HGA-TDRS In View Event
HGA-TDRS_In_View_TDE	HGA-TDRS In View Event
HGA-TDRS_In_View_TDS	HGA-TDRS In View Event
HGA-TDRS_In_View_TDW	HGA-TDRS In View Event
HGA-TDRS_Start_View_047	HGA-to-TDRS InView Start
HGA-TDRS_Start_View_TDE	HGA-to-TDRS InView Start
HGA-TDRS_Start_View_TDS	HGA-to-TDRS InView Start
HGA-TDRS_Start_View_TDW	HGA-to-TDRS InView Start
Hot_Zone_In_View_047	Hot Zones
Hot_Zone_In_View_TDE	Hot Zones
Hot_Zone_In_View_TDS	Hot Zones
Hot_Zone_In_View_TDW	Hot Zones
MISR_Footprint_Tgt_Vis_Duration_	MISR Visbility Target for London Duration Event
MISR_Footprint_Tgt_Vis_Entry_Lon	MISR Target Visibility Entry for London Event
MISR_Footprint_Tgt_Vis_Exit_Lond	MISR Target Visibility Exit for London
MISR_FP_Dur_Amazon_SCI	Within Footprint Duration Event
MISR_FP_Dur_Antartic_Cir_SCI	Within Footprint Duration Event
MISR_FP_Dur_Antartica_SCI	Within Footprint Duration Event

Event Mnemonic	Event Description
MISR_FP_Dur_Bacia/Ducke_SCI	Within Footprint Duration Event
MISR_FP_Dur_Beaufort_Sea_SCI	Within Footprint Duration Event
MISR_FP_Dur_Beij/Tian_SCI	Within Footprint Duration Event
MISR_FP_Dur_CA_Strato_SCI	Within Footprint Duration Event
MISR_FP_Dur_Caspian_Sea_SCI	Within Footprint Duration Event
MISR_FP_Dur_Central_Plns_SCI	Within Footprint Duration Event
MISR_FP_Dur_Chesapk_Bay_SCI	Within Footprint Duration Event
MISR_FP_Dur_Chicago/Gry_SCI	Within Footprint Duration Event
MISR_FP_Dur_Greenland_SCI	Within Footprint Duration Event
MISR_FP_Dur_Heihe/Rvr__SCI	Within Footprint Duration Event
MISR_FP_Dur_HI_Ocn/Aloha_SCI	Within Footprint Duration Event
MISR_FP_Dur_Imperial_Val_SCI	Within Footprint Duration Event
MISR_FP_Dur_Kanss/Neb_SCI	Within Footprint Duration Event
MISR_FP_Dur_Kilauea,_HI_SCI	Within Footprint Duration Event
MISR_FP_Dur_Konza_Prare_SCI	Within Footprint Duration Event
MISR_FP_Dur_Labrador_Sea_SCI	Within Footprint Duration Event
MISR_FP_Dur_Lake_Eyre_SCI	Within Footprint Duration Event
MISR_FP_Dur_Luverne_SCI	Within Footprint Duration Event
MISR_FP_Dur_Mali_SCI	Within Footprint Duration Event
MISR_FP_Dur_Miss_Delta_SCI	Within Footprint Duration Event
MISR_FP_Dur_Mono/Tahoe_SCI	Within Footprint Duration Event
MISR_FP_Dur_Montreal_VAL	Within Footprint Duration Event
MISR_FP_Dur_Mt_Everest_SCI	Within Footprint Duration Event
MISR_FP_Dur_Mtry_Bay/SFO_SCI	Within Footprint Duration Event
MISR_FP_Dur_N_Argentina_SCI	Within Footprint Duration Event
MISR_FP_Dur_N_Minnesota_SCI	Within Footprint Duration Event
MISR_FP_Dur_New_York_SCI	Within Footprint Duration Event
MISR_FP_Dur_Niger_SCI	Within Footprint Duration Event
MISR_FP_Dur_Norweg_Sea_SCI	Within Footprint Duration Event
MISR_FP_Dur_Norwegian_Sea_SCI	Within Footprint Duration Event
MISR_FP_Dur_Pacaya_SCI	Within Footprint Duration Event
MISR_FP_Dur_Poligono_SCI	Within Footprint Duration Event
MISR_FP_Dur_Rocky_Mtns_SCI	Within Footprint Duration Event
MISR_FP_Dur_S._Cal_VAL	Within Footprint Duration Event
MISR_FP_Dur_S_Pacific_SCI	Within Footprint Duration Event
MISR_FP_Dur_Sahara_SCI	Within Footprint Duration Event
MISR_FP_Dur_Sakura_SCI	Within Footprint Duration Event
MISR_FP_Dur_Samuel_Resrv_SCI	Within Footprint Duration Event
MISR_FP_Dur_Saudi_Arabia_SCI	Within Footprint Duration Event

Event Mnemonic	Event Description
MISR_FP_Dur_Semeru_SCI	Within Footprint Duration Event
MISR_FP_Dur_Senegal_SCI	Within Footprint Duration Event
MISR_FP_Dur_Siberia_SCI	Within Footprint Duration Event
MISR_FP_Dur_State_Coll_VAL	Within Footprint Duration Event
MISR_FP_Dur_State_College,_PA_VA	Within Footprint Duration Event
MISR_FP_Dur_Stromb/Etna_SCI	Within Footprint Duration Event
MISR_FP_Dur_SW_Penn_SCI	Within Footprint Duration Event
MISR_FP_Dur_Tefe_SCI	Within Footprint Duration Event
MISR_FP_Dur_Temp_Atlantc_SCI	Within Footprint Duration Event
MISR_FP_Dur_Temp_Pac_SCI	Within Footprint Duration Event
MISR_FP_Dur_Trop,_Atlntc_SCI	Within Footprint Duration Event
MISR_FP_Dur_Trop,_Pacifc_SCI	Within Footprint Duration Event
MISR_FP_Dur_Trop_Pacific_SCI	Within Footprint Duration Event
MISR_FP_Dur_Tucupare_SCI	Within Footprint Duration Event
MISR_FP_Dur_Uatuma_SCI	Within Footprint Duration Event
MISR_FP_Dur_Wang_Panda_SCI	Within Footprint Duration Event
MISR_FP_Dur_White_Island_SCI	Within Footprint Duration Event
MISR_FP_Dur_White_Sands_VAL	Within Footprint Duration Event
MISR_FP_Entry_Amazon_SCI	Within Footprint Start Event
MISR_FP_Entry_Antartic_Cir_SCI	Within Footprint Start Event
MISR_FP_Entry_Antartica_SCI	Within Footprint Start Event
MISR_FP_Entry_Bacia/Ducke_SCI	Within Footprint Start Event
MISR_FP_Entry_Beaufort_Sea_SCI	Within Footprint Start Event
MISR_FP_Entry_Beij/Tian_SCI	Within Footprint Start Event
MISR_FP_Entry_CA_Strato_SCI	Within Footprint Start Event
MISR_FP_Entry_Caspian_Sea_SCI	Within Footprint Start Event
MISR_FP_Entry_Central_Plns_SCI	Within Footprint Start Event
MISR_FP_Entry_Chesapk_Bay_SCI	Within Footprint Start Event
MISR_FP_Entry_Chicago/Gry_SCI	Within Footprint Start Event
MISR_FP_Entry_Greenland_SCI	Within Footprint Start Event
MISR_FP_Entry_Heihe/Rvr__SCI	Within Footprint Start Event
MISR_FP_Entry_HI_Ocn/Aloha_SCI	Within Footprint Start Event
MISR_FP_Entry_Imperial_Val_SCI	Within Footprint Start Event
MISR_FP_Entry_Kanss/Neb_SCI	Within Footprint Start Event
MISR_FP_Entry_Kilauea,_HI_SCI	Within Footprint Start Event
MISR_FP_Entry_Konza_Prare_SCI	Within Footprint Start Event
MISR_FP_Entry_Labrador_Sea_SCI	Within Footprint Start Event
MISR_FP_Entry_Lake_Eyre_SCI	Within Footprint Start Event
MISR_FP_Entry_Luverne_SCI	Within Footprint Start Event

Event Mnemonic	Event Description
MISR_FP_Entry_Mali_SCI	Within Footprint Start Event
MISR_FP_Entry_Miss_Delta_SCI	Within Footprint Start Event
MISR_FP_Entry_Mono/Tahoe_SCI	Within Footprint Start Event
MISR_FP_Entry_Montreal_VAL	Within Footprint Start Event
MISR_FP_Entry_Mt_Everest_SCI	Within Footprint Start Event
MISR_FP_Entry_Mtry_Bay/SFO_SCI	Within Footprint Start Event
MISR_FP_Entry_N_Argentina_SCI	Within Footprint Start Event
MISR_FP_Entry_N_Minnesota_SCI	Within Footprint Start Event
MISR_FP_Entry_New_York_SCI	Within Footprint Start Event
MISR_FP_Entry_Niger_SCI	Within Footprint Start Event
MISR_FP_Entry_Norweg_Sea_SCI	Within Footprint Start Event
MISR_FP_Entry_Norwegian_Sea_SCI	Within Footprint Start Event
MISR_FP_Entry_Pacaya_SCI	Within Footprint Start Event
MISR_FP_Entry_Poligono_SCI	Within Footprint Start Event
MISR_FP_Entry_Rocky_Mtns_SCI	Within Footprint Start Event
MISR_FP_Entry_S._Cal_VAL	Within Footprint Start Event
MISR_FP_Entry_S_Pacific_SCI	Within Footprint Start Event
MISR_FP_Entry_Sahara_SCI	Within Footprint Start Event
MISR_FP_Entry_Sakura_SCI	Within Footprint Start Event
MISR_FP_Entry_Samuel_Resrv_SCI	Within Footprint Start Event
MISR_FP_Entry_Saudi_Arabia_SCI	Within Footprint Start Event
MISR_FP_Entry_Semeru_SCI	Within Footprint Start Event
MISR_FP_Entry_Senegal_SCI	Within Footprint Start Event
MISR_FP_Entry_Siberia_SCI	Within Footprint Start Event
MISR_FP_Entry_State_Coll_VAL	Within Footprint Start Event
MISR_FP_Entry_State_College,_PA_	Within Footprint Start Event
MISR_FP_Entry_Stromb/Etna_SCI	Within Footprint Start Event
MISR_FP_Entry_SW_Penn_SCI	Within Footprint Start Event
MISR_FP_Entry_Tefe_SCI	Within Footprint Start Event
MISR_FP_Entry_Temp_Atlantc_SCI	Within Footprint Start Event
MISR_FP_Entry_Temp_Pac_SCI	Within Footprint Start Event
MISR_FP_Entry_Trop,_Atlntc_SCI	Within Footprint Start Event
MISR_FP_Entry_Trop,_Pacifc_SCI	Within Footprint Start Event
MISR_FP_Entry_Trop_Pacific_SCI	Within Footprint Start Event
MISR_FP_Entry_Tucupare_SCI	Within Footprint Start Event
MISR_FP_Entry_Uatuma_SCI	Within Footprint Start Event
MISR_FP_Entry_Wang_Panda_SCI	Within Footprint Start Event
MISR_FP_Entry_White_Island_SCI	Within Footprint Start Event
MISR_FP_Entry_White_Sands_VAL	Within Footprint Start Event

Event Mnemonic	Event Description
MISR_FP_Exit_Amazon_SCI	Within Footprint End Event
MISR_FP_Exit_Antartic_Cir_SCI	Within Footprint End Event
MISR_FP_Exit_Antartica_SCI	Within Footprint End Event
MISR_FP_Exit_Bacia/Ducke_SCI	Within Footprint End Event
MISR_FP_Exit_Beaufort_Sea_SCI	Within Footprint End Event
MISR_FP_Exit_Beij/Tian_SCI	Within Footprint End Event
MISR_FP_Exit_CA_Strato_SCI	Within Footprint End Event
MISR_FP_Exit_Caspian_Sea_SCI	Within Footprint End Event
MISR_FP_Exit_Central_Plns_SCI	Within Footprint End Event
MISR_FP_Exit_Chesapk_Bay_SCI	Within Footprint End Event
MISR_FP_Exit_Chicago/Gry_SCI	Within Footprint End Event
MISR_FP_Exit_Greenland_SCI	Within Footprint End Event
MISR_FP_Exit_Heihe/Rvr__SCI	Within Footprint End Event
MISR_FP_Exit_HI_Ocn/Aloha_SCI	Within Footprint End Event
MISR_FP_Exit_Imperial_Val_SCI	Within Footprint End Event
MISR_FP_Exit_Kanss/Neb_SCI	Within Footprint End Event
MISR_FP_Exit_Kilauea,_HI_SCI	Within Footprint End Event
MISR_FP_Exit_Konza_Prare_SCI	Within Footprint End Event
MISR_FP_Exit_Labrador_Sea_SCI	Within Footprint End Event
MISR_FP_Exit_Lake_Eyre_SCI	Within Footprint End Event
MISR_FP_Exit_Luverne_SCI	Within Footprint End Event
MISR_FP_Exit_Mali_SCI	Within Footprint End Event
MISR_FP_Exit_Miss_Delta_SCI	Within Footprint End Event
MISR_FP_Exit_Mono/Tahoe_SCI	Within Footprint End Event
MISR_FP_Exit_Montreal_VAL	Within Footprint End Event
MISR_FP_Exit_Mt_Everest_SCI	Within Footprint End Event
MISR_FP_Exit_Mtry_Bay/SFO_SCI	Within Footprint End Event
MISR_FP_Exit_N_Argentina_SCI	Within Footprint End Event
MISR_FP_Exit_N_Minnesota_SCI	Within Footprint End Event
MISR_FP_Exit_New_York_SCI	Within Footprint End Event
MISR_FP_Exit_Niger_SCI	Within Footprint End Event
MISR_FP_Exit_Norweg_Sea_SCI	Within Footprint End Event
MISR_FP_Exit_Norwegian_Sea_SCI	Within Footprint End Event
MISR_FP_Exit_Pacaya_SCI	Within Footprint End Event
MISR_FP_Exit_Poligono_SCI	Within Footprint End Event
MISR_FP_Exit_Rocky_Mtns_SCI	Within Footprint End Event
MISR_FP_Exit_S._Cal_VAL	Within Footprint End Event
MISR_FP_Exit_S_Pacific_SCI	Within Footprint End Event
MISR_FP_Exit_Sahara_SCI	Within Footprint End Event

Event Mnemonic	Event Description
MISR_FP_Exit_Sakura_SCI	Within Footprint End Event
MISR_FP_Exit_Samuel_Resrv_SCI	Within Footprint End Event
MISR_FP_Exit_Saudi_Arabia_SCI	Within Footprint End Event
MISR_FP_Exit_Semeru_SCI	Within Footprint End Event
MISR_FP_Exit_Senegal_SCI	Within Footprint End Event
MISR_FP_Exit_Siberia_SCI	Within Footprint End Event
MISR_FP_Exit_State_Coll_VAL	Within Footprint End Event
MISR_FP_Exit_State_College,_PA_V	Within Footprint End Event
MISR_FP_Exit_Stromb/Etna_SCI	Within Footprint End Event
MISR_FP_Exit_SW_Penn_SCI	Within Footprint End Event
MISR_FP_Exit_Tefe_SCI	Within Footprint End Event
MISR_FP_Exit_Temp_Atlantc_SCI	Within Footprint End Event
MISR_FP_Exit_Temp_Pac_SCI	Within Footprint End Event
MISR_FP_Exit_Trop,_Atlntc_SCI	Within Footprint End Event
MISR_FP_Exit_Trop,_Pacifc_SCI	Within Footprint End Event
MISR_FP_Exit_Trop_Pacific_SCI	Within Footprint End Event
MISR_FP_Exit_Tucupare_SCI	Within Footprint End Event
MISR_FP_Exit_Uatuma_SCI	Within Footprint End Event
MISR_FP_Exit_Wang_Panda_SCI	Within Footprint End Event
MISR_FP_Exit_White_Island_SCI	Within Footprint End Event
MISR_FP_Exit_White_Sands_VAL	Within Footprint End Event
MISR_Moon_Entry	Sun/Moon Field of View MISR Moon Entry Event
MISR_Moon_Exit	Sun/Moon Field of View MISR Moon Entry Exit
MISR_Moon_In_View	Sun/Moon Field of View MISR Moon in View Event
MISR_Nadir_Amazon_SCI	Target Closest Approach to Nadir
MISR_Nadir_Antartic_Cir_SCI	Target Closest Approach to Nadir
MISR_Nadir_Antartica_SCI	Target Closest Approach to Nadir
MISR_Nadir_Bacia/Ducke_SCI	Target Closest Approach to Nadir
MISR_Nadir_Beaufort_Sea_SCI	Target Closest Approach to Nadir
MISR_Nadir_Beij/Tian_SCI	Target Closest Approach to Nadir
MISR_Nadir_CA_Strato_SCI	Target Closest Approach to Nadir
MISR_Nadir_Caspian_Sea_SCI	Target Closest Approach to Nadir
MISR_Nadir_Central_Plns_SCI	Target Closest Approach to Nadir
MISR_Nadir_Chesapk_Bay_SCI	Target Closest Approach to Nadir
MISR_Nadir_Chicago/Gry_SCI	Target Closest Approach to Nadir
MISR_Nadir_Greenland_SCI	Target Closest Approach to Nadir
MISR_Nadir_Heihe/Rvr__SCI	Target Closest Approach to Nadir
MISR_Nadir_HI_Ocn/Aloha_SCI	Target Closest Approach to Nadir
MISR_Nadir_Imperial_Val_SCI	Target Closest Approach to Nadir

Event Mnemonic	Event Description
MISR_Nadir_Kanss/Neb_SCI	Target Closest Approach to Nadir
MISR_Nadir_Kilauea,_HI_SCI	Target Closest Approach to Nadir
MISR_Nadir_Konza_Prare_SCI	Target Closest Approach to Nadir
MISR_Nadir_Labrador_Sea_SCI	Target Closest Approach to Nadir
MISR_Nadir_Lake_Eyre_SCI	Target Closest Approach to Nadir
MISR_Nadir_Luverne_SCI	Target Closest Approach to Nadir
MISR_Nadir_Mali_SCI	Target Closest Approach to Nadir
MISR_Nadir_Miss_Delta_SCI	Target Closest Approach to Nadir
MISR_Nadir_Mono/Tahoe_SCI	Target Closest Approach to Nadir
MISR_Nadir_Montreal_VAL	Target Closest Approach to Nadir
MISR_Nadir_Mt_Everest_SCI	Target Closest Approach to Nadir
MISR_Nadir_Mtry_Bay/SFO_SCI	Target Closest Approach to Nadir
MISR_Nadir_N_Argentina_SCI	Target Closest Approach to Nadir
MISR_Nadir_N_Minnesota_SCI	Target Closest Approach to Nadir
MISR_Nadir_New_York_SCI	Target Closest Approach to Nadir
MISR_Nadir_Niger_SCI	Target Closest Approach to Nadir
MISR_Nadir_Norweg_Sea_SCI	Target Closest Approach to Nadir
MISR_Nadir_Norwegian_Sea_SCI	Target Closest Approach to Nadir
MISR_Nadir_Pacaya_SCI	Target Closest Approach to Nadir
MISR_Nadir_Poligono_SCI	Target Closest Approach to Nadir
MISR_Nadir_Rocky_Mtns_SCI	Target Closest Approach to Nadir
MISR_Nadir_S._Cal_VAL	Target Closest Approach to Nadir
MISR_Nadir_S_Pacific_SCI	Target Closest Approach to Nadir
MISR_Nadir_Sahara_SCI	Target Closest Approach to Nadir
MISR_Nadir_Sakura_SCI	Target Closest Approach to Nadir
MISR_Nadir_Samuel_Resrv_SCI	Target Closest Approach to Nadir
MISR_Nadir_Saudi_Arabia_SCI	Target Closest Approach to Nadir
MISR_Nadir_Semeru_SCI	Target Closest Approach to Nadir
MISR_Nadir_Senegal_SCI	Target Closest Approach to Nadir
MISR_Nadir_Siberia_SCI	Target Closest Approach to Nadir
MISR_Nadir_State_Coll_VAL	Target Closest Approach to Nadir
MISR_Nadir_State_College,_PA_VAL	Target Closest Approach to Nadir
MISR_Nadir_Stromb/Etna_SCI	Target Closest Approach to Nadir
MISR_Nadir_SW_Penn_SCI	Target Closest Approach to Nadir
MISR_Nadir_Tefe_SCI	Target Closest Approach to Nadir
MISR_Nadir_Temp_Atlantc_SCI	Target Closest Approach to Nadir
MISR_Nadir_Temp_Pac_SCI	Target Closest Approach to Nadir
MISR_Nadir_Trop,_Atlntc_SCI	Target Closest Approach to Nadir
MISR_Nadir_Trop,_Pacifc_SCI	Target Closest Approach to Nadir

Event Mnemonic	Event Description
MISR_Nadir_Trop_Pacific_SCI	Target Closest Approach to Nadir
MISR_Nadir_Tucupare_SCI	Target Closest Approach to Nadir
MISR_Nadir_Uatuma_SCI	Target Closest Approach to Nadir
MISR_Nadir_Wang_Panda_SCI	Target Closest Approach to Nadir
MISR_Nadir_White_Island_SCI	Target Closest Approach to Nadir
MISR_Nadir_White_Sands_VAL	Target Closest Approach to Nadir
MISR_Sun_Entry	Sun/Moon Field of View MISR Sun Entry Event
MISR_Sun_Exit	Sun/Moon Field of View MISR Sun Exit Event
MISR_Sun_In_View	Sun/Moon Field of View MISR Sun in View Event
MISR_Tgt_Closest_Approach_To_Nad	MISR Tgt Closest Approach To Nadir To London Event
MISR_Tgt_Closest_Approach_to_Nad	Target Closest Approach to Nadir
MISR1_LOS_Term_Crossing_to_Day	MISR Camera 1 Loss of Signal Terminator Crossing-to-Day Event
MISR1_LOS_Term_Crossing_to_Night	MISR Camera 1 Loss of Signal Terminator Crossing-to-Night Event
MISR2_LOS_Term_Crossing_to_Day	MISR Camera 2 Loss of Signal Terminator Crossing-to-Day Event
MISR2_LOS_Term_Crossing_to_Night	MISR Camera 2 Loss of Signal Terminator Crossing-to-Night Event
MISR3_LOS_Term_Crossing_to_Day	MISR Camera 3 Loss of Signal Terminator Crossing-to-Day Event
MISR3_LOS_Term_Crossing_to_Night	MISR Camera 3 Loss of Signal Terminator Crossing-to-Night Event
MISR4_LOS_Term_Crossing_to_Day	MISR Camera 4 Loss of Signal Terminator Crossing-to-Day Event
MISR4_LOS_Term_Crossing_to_Night	MISR Camera 4 Loss of Signal Terminator Crossing-to-Night Event
MISR5_LOS_Term_Crossing_to_Day	MISR Camera 5 Loss of Signal Terminator Crossing-to-Day Event
MISR5_LOS_Term_Crossing_to_Night	MISR Camera 5 Loss of Signal Terminator Crossing-to-Night Event
MISR6_LOS_Term_Crossing_to_Day	MISR Camera 6 Loss of Signal Terminator Crossing-to-Day Event
MISR6_LOS_Term_Crossing_to_Night	MISR Camera 6 Loss of Signal Terminator Crossing-to-Night Event
MISR7_LOS_Term_Crossing_to_Day	MISR Camera 7 Loss of Signal Terminator Crossing-to-Day Event
MISR7_LOS_Term_Crossing_to_Night	MISR Camera 7 Loss of Signal Terminator Crossing-to-Night Event
MISR8_LOS_Term_Crossing_to_Day	MISR Camera 8 Loss of Signal Terminator Crossing-to-Day Event

Event Mnemonic	Event Description
MISR8_LOS_Term_Crossing_to_Night	MISR Camera 8 Loss of Signal Terminator Crossing-to-Night Event
MISR9_LOS_Term_Crossing_to_Day	MISR Camera 9 Loss of Signal Terminator Crossing-to-Day Event
MISR9_LOS_Term_Crossing_to_Night	MISR Camera 9 Loss of Signal Terminator Crossing-to-Night Event
MODIS_Diffuser_Moon_Entry	Sun/Moon Event
MODIS_Diffuser_Moon_Exit	Sun/Moon Event
MODIS_Diffuser_Moon_In_View	Sun/Moon In View Event
MODIS_Diffuser_Sun_Entry	Sun/Moon Event
MODIS_Diffuser_Sun_Exit	Sun/Moon Event
MODIS_Diffuser_Sun_In_View	Sun/Moon In View Event
MODIS_Footprint_Tgt_Vis_Duration	MODIS Target Visibility for Paris Duration Event
MODIS_Footprint_Tgt_Vis_Entry_Pa	MODIS Target Visibility Entry for Paris Entry Event
MODIS_Footprint_Tgt_Vis_Exit_Par	MODIS Target Visibility Exit for Paris Event
MODIS_Jupiter_Entry	Planet/Star Field of View MODIS Jupiter Entry Event
MODIS_Jupiter_Exit	Planet/Star Field of View MODIS Jupiter Exit Event
MODIS_LOS_Term_Crossing_to_Day	MODIS Loss of Signal Terminator Crossing-to-Day Event
MODIS_LOS_Term_Crossing_to_Night	MODIS Loss of Signal Terminator Crossing-to-Night Event
MODIS_Mars_Entry	Planet/Star Field of View MODIS Mars Entry Event
MODIS_Mars_Exit	Planet/Star Field of View MODIS Mars Exit Event
MODIS_Mercury_Entry	Planet/Star Field of View MODIS Mercury Entry Event
MODIS_Mercury_Exit	Planet/Star Field of View MODIS Mercury Exit Event
MODIS_Moon_Entry	Sun/Moon Field of View MODIS Moon Entry Event
MODIS_Moon_Exit	Sun/Moon Field of View MODIS Moon Entry Exit Event
MODIS_Moon_In_View	Sun/Moon Field of View MODIS Moon in View Event
MODIS_Neptune_Entry	Planet/Star Field of View MODIS Neptune Entry Event
MODIS_Neptune_Exit	Planet/Star Field of View MODIS Neptune Exit Event
MODIS_Pluto_Entry	Planet/Star Field of View MODIS Pluto Entry Event
MODIS_Pluto_Exit	Planet/Star Field of View MODIS Pluto Exit Event
MODIS_Saturn_Entry	Planet/Star Field of View MODIS Saturn Entry Event
MODIS_Saturn_Exit	Planet/Star Field of View MODIS Saturn Exit Event
MODIS_Spaceview_Moon_Entry	Sun/Moon Event
MODIS_Spaceview_Moon_Exit	Sun/Moon Event
MODIS_Spaceview_Moon_In_View	Sun/Moon In View Event
MODIS_Spaceview_Sun_Entry	Sun/Moon Event
MODIS_Spaceview_Sun_Exit	Sun/Moon Event
MODIS_Spaceview_Sun_In_View	Sun/Moon In View Event
MODIS_Star_Entry	Planet/Star Field of View MODIS Star Entry Event
MODIS_Star_Exit	Planet/Star Field of View MODIS Star Exit Event

Event Mnemonic	Event Description
MODIS_Sun_Entry	Sun/Moon Field of View MODIS Sun Entry Event
MODIS_Sun_Exit	Sun/Moon Field of View MODIS Sun Exit Event
MODIS_Sun_In_View	Sun/Moon Field of View MODIS Sun in View Event
MODIS_Target_FOV_Entry	MODIS Target Field Of View Entry
MODIS_Target_FOV_Exit	MODIS Target Field Of View Exit
MODIS_Target_FOV_In_View	MODIS Target Field Of View In View
MODIS_Tgt_Closest_Approach_To_Na	MODIS Tgt Closest Approach To Nadir To Antarctica Event
MODIS_Tgt_Closest_Approach_To_Na	MODIS Tgt Closest Approach To Nadir To Paris Event
MODIS_Uranus_Entry	Planet/Star Field of View MODIS Uranus Entry Event
MODIS_Uranus_Exit	Planet/Star Field of View MODIS Uranus Exit Event
MODIS_Venus_Entry	Planet/Star Field of View MODIS Venus Entry Event
MODIS_Venus_Exit	Planet/Star Field of View MODIS Venus Exit Event
MOPITT_Footprint_Tgt_Vis_Duratio	MOPITT Visiility Target for Hawaii Duration Event
MOPITT_Footprint_Tgt_Vis_Entry_H	MOPITT Target Visibility Entry for Hawaii Entry Event
MOPITT_Footprint_Tgt_Vis_Exit_Ha	MOPITT Target Visibility Exit for Hawaii Event
MOPITT_Tgt_Closest_Approach_To_N	MOPITT Tgt Closest Approach To Nadir To Hawaii Event
Nadir_Term_Crossing_to_Day	Nadir Terminator Crossing from Night to Day Event
Nadir_Term_Crossing_to_Nite	Nadir Terminator Crossing from Day to Night Event
Node_Ascending	Ascending Node Time of Crossing and Longitude Event
Node_Descending	Descending Node Time of Crossing and lLngitude Event
OMNI-GND_End_View_AG1S	Omni-to-Ground Station
OMNI-GND_End_View_AG1S	Omni-to-Ground Station
OMNI-GND_End_View_AGS	Omni-to-Ground Station
OMNI-GND_End_View_BMD	Omni-to-Ground Station
OMNI-GND_End_View_BMD	Omni-to-Ground Station
OMNI-GND_End_View_GDS	Omni-to-Ground Station
OMNI-GND_End_View_GDS	Omni-to-Ground Station
OMNI-GND_End_View_SG1S	Omni-to-Ground Station
OMNI-GND_End_View_SG1S	Omni-to-Ground Station
OMNI-GND_End_View_SGS	Omni-to-Ground Station
OMNI-GND_End_View_WAPS	Omni-to-Ground Station
OMNI-GND_End_View_WGS	Omni-to-Ground Station
OMNI-GND_End_View_WPSA	Omni-to-Ground Station
OMNI-GND_End_View_WPSA	Omni-to-Ground Station
OMNI-GND_In_View_AG1S	Omni-to-Ground Station
OMNI-GND_In_View_AG1S	Omni-to-Ground Station
OMNI-GND_In_View_AGS	Omni-to-Ground Station
OMNI-GND_In_View_BMD	Omni-to-Ground Station

Event Mnemonic	Event Description
OMNI-GND_In_View_BMD	Omni-to-Ground Station
OMNI-GND_In_View_GDS	Omni-to-Ground Station
OMNI-GND_In_View_GDS	Omni-to-Ground Station
OMNI-GND_In_View_SG1S	Omni-to-Ground Station
OMNI-GND_In_View_SG1S	Omni-to-Ground Station
OMNI-GND_In_View_SGS	Omni-to-Ground Station
OMNI-GND_In_View_WAPS	Omni-to-Ground Station
OMNI-GND_In_View_WGS	Omni-to-Ground Station
OMNI-GND_In_View_WPSA	Omni-to-Ground Station
OMNI-GND_In_View_WPSA	Omni-to-Ground Station
OMNI-GND_Start_View_AG1S	Omni-to_Ground Station
OMNI-GND_Start_View_AG1S	Omni-to_Ground Station
OMNI-GND_Start_View_AGS	Omni-to_Ground Station
OMNI-GND_Start_View_BMD	Omni-to_Ground Station
OMNI-GND_Start_View_BMD	Omni-to_Ground Station
OMNI-GND_Start_View_GDS	Omni-to_Ground Station
OMNI-GND_Start_View_GDS	Omni-to_Ground Station
OMNI-GND_Start_View_SG1S	Omni-to_Ground Station
OMNI-GND_Start_View_SG1S	Omni-to_Ground Station
OMNI-GND_Start_View_SGS	Omni-to_Ground Station
OMNI-GND_Start_View_WAPS	Omni-to_Ground Station
OMNI-GND_Start_View_WGS	Omni-to_Ground Station
OMNI-GND_Start_View_WPSA	Omni-to_Ground Station
OMNI-GND_Start_View_WPSA	Omni-to_Ground Station
OMNI-TDRS_End_View_047	OMNI-to-TDRS In View Stop
OMNI-TDRS_End_View_TDE	OMNI-to-TDRS In View Stop
OMNI-TDRS_End_View_TDS	OMNI-to-TDRS In View Stop
OMNI-TDRS_End_View_TDW	OMNI-to-TDRS In View Stop
OMNI-TDRS_In_View_047	OMNI-TDRS In View Event
OMNI-TDRS_In_View_TDE	OMNI-TDRS In View Event
OMNI-TDRS_In_View_TDS	OMNI-TDRS In View Event
OMNI-TDRS_In_View_TDW	OMNI-TDRS In View Event
OMNI-TDRS_Start_View_047	OMNI-to-TDRS InView Start
OMNI-TDRS_Start_View_TDE	OMNI-to-TDRS InView Start
OMNI-TDRS_Start_View_TDS	OMNI-to-TDRS InView Start
OMNI-TDRS_Start_View_TDW	OMNI-to-TDRS InView Start
Orbit_Start	Orbit Start Event
PERIGEE	Perigee Event
S/C_Day	Day Event

Event Mnemonic	Event Description
S/C_Day/Night	Sunset Event
S/C_Maximum_Latitude	Maximum Latitude Event
S/C_Minimum_Latitude	Minimum Latitude Event
S/C_Night	Night Event
S/C_Night/Day	Sunrise Event
S/C_Noon	Noon Event
SAA_Entry	South Atlantic Anomaly Entry Event
SAA_Exit	South Atlantic Anomaly Exit Event
SAA_In_Anomaly	South Atlantic in Anomaly Event
Solar_Eclipse_Entry	Solar Eclipse Entry Event
Solar_Eclipse_Exit	Solar Eclipse Exit Event
Solar_Eclipse_In_Eclipse	Solar Eclipse Event
VA_Belt_Entry	Van Allen Belt entrance Event
VA_Belt_Exit	Van Allen Belt Exit Event
VA_Belt_In_Belt	Van Allen Belt In Belt Event
X-Band_Interfere_Dur_AG1S	X-Band Interference
X-Band_Interfere_Dur_DSN16	X-Band Interference
X-Band_Interfere_Dur_DSN46	X-Band Interference
X-Band_Interfere_Dur_DSN46	X-Band Interference
X-Band_Interfere_Dur_PKFT	X-Band Interference
X-Band_Interfere_Dur_PKFT	X-Band Interference
X-Band_Interfere_Dur_SG1S	X-Band Interference
X-Band_Interfere_Dur_SVAL	X-Band Interference
X-Band_Interfere_Dur_SVAL	X-Band Interference
X-Band_Interfere_Dur_WAPS	X-Band Interference
X-Band_Interfere_End_AG1S	X-Band Interference
X-Band_Interfere_End_DSN16	X-Band Interference
X-Band_Interfere_End_DSN46	X-Band Interference
X-Band_Interfere_End_DSN46	X-Band Interference
X-Band_Interfere_End_PKFT	X-Band Interference
X-Band_Interfere_End_PKFT	X-Band Interference
X-Band_Interfere_End_SG1S	X-Band Interference
X-Band_Interfere_End_SVAL	X-Band Interference
X-Band_Interfere_End_SVAL	X-Band Interference
X-Band_Interfere_End_WAPS	X-Band Interference
X-Band_Interfere_Start_AG1S	X-Band Interference
X-Band_Interfere_Start_DSN16	X-Band Interference
X-Band_Interfere_Start_DSN46	X-Band Interference
X-Band_Interfere_Start_DSN46	X-Band Interference

Event Mnemonic	Event Description
X-Band_Interfere_Start_PKFT	X-Band Interference
X-Band_Interfere_Start_PKFT	X-Band Interference
X-Band_Interfere_Start_SG1S	X-Band Interference
X-Band_Interfere_Start_SVAL	X-Band Interference
X-Band_Interfere_Start_SVAL	X-Band Interference
X-Band_Interfere_Start_WAPS	X-Band Interference
X-Band-GND_End_View_AG1S	Ground Contact
X-Band-GND_End_View_AGS	Ground Contact
X-Band-GND_End_View_BMD	Ground Contact
X-Band-GND_End_View_BMD	Ground Contact
X-Band-GND_End_View_GDS	Ground Contact
X-Band-GND_End_View_GDS	Ground Contact
X-Band-GND_End_View_PKFT	Ground Contact
X-Band-GND_End_View_SG1S	Ground Contact
X-Band-GND_End_View_SGS	Ground Contact
X-Band-GND_End_View_SVAL	Ground Contact
X-Band-GND_End_View_WAPS	Ground Contact
X-Band-GND_End_View_WGS	Ground Contact
X-Band-GND_In_View_AG1S	Ground Contact
X-Band-GND_In_View_AGS	Ground Contact
X-Band-GND_In_View_BMD	Ground Contact
X-Band-GND_In_View_BMD	Ground Contact
X-Band-GND_In_View_GDS	Ground Contact
X-Band-GND_In_View_GDS	Ground Contact
X-Band-GND_In_View_PKFT	Ground Contact
X-Band-GND_In_View_SG1S	Ground Contact
X-Band-GND_In_View_SGS	Ground Contact
X-Band-GND_In_View_SVAL	Ground Contact
X-Band-GND_In_View_WAPS	Ground Contact
X-Band-GND_In_View_WGS	Ground Contact
X-Band-GND_Start_View_AG1S	Ground Contact
X-Band-GND_Start_View_AGS	Ground Contact
X-Band-GND_Start_View_BMD	Ground Contact
X-Band-GND_Start_View_BMD	Ground Contact
X-Band-GND_Start_View_GDS	Ground Contact
X-Band-GND_Start_View_GDS	Ground Contact
X-Band-GND_Start_View_PKFT	Ground Contact
X-Band-GND_Start_View_SG1S	Ground Contact
X-Band-GND_Start_View_SGS	Ground Contact

Event Mnemonic	Event Description
X-Band-GND_Start_View_SVAL	Ground Contact
X-Band-GND_Start_View_WAPS	Ground Contact
X-Band-GND_Start_View_WGS	Ground Contact

Appendix B. Example Detailed Activity Record

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DAS1999260004EOCASTAM1ASTSCHEDULE01199933920000019993402000000000000589
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
000000000000294                                                1999339202136
1999339204636                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
000000000000292                                                1999339211023
1999339213523                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
000000000000294                                                1999339214500
1999339221000                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
000000000000292                                                1999339225000
1999339231500                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999339235000                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340005200                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340014000                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340023205                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340032052                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340054913                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340063800                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340072647                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340081534                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340090621                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340095508                0000
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ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340104555                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340113642                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340131416                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340140303                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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1999340145150                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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1999340172211                0000
ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H02.2
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ACTABSAM1 S-Band SA Uplink (SSAF)            H10.2
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ACTABSAM1 K-Band SA Uplink (KSAF)            N91.2
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1999339204636                0000
ACTABSAM1 K-Band SA Uplink (KSAF)            N91.2
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1999340225133                0000
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1999340234101                0000
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000000000000156Nadir_Term_Crossing_to_Night     0000052201+03341999340121222
1990001000001               0000
ACTEVTAM1 MISR                                  MISR_GLOBAL.3
000000000000157Nadir_Term_Crossing_to_Day       0000052301-03341999340125439
1990001000709               0000
ACTEVTAM1 MISR                                  MISR_ENG.1
000000000000156Nadir_Term_Crossing_to_Night     0000052301+03341999340135116
1990001000001               0000
ACTEVTAM1 MISR                                  MISR_GLOBAL.3
000000000000157Nadir_Term_Crossing_to_Day       0000052401-03341999340143333
1990001000709               0000
ACTEVTAM1 MISR                                  MISR_ENG.1
000000000000156Nadir_Term_Crossing_to_Night     0000052401+03341999340153009
1990001000001               0000
ACTEVTAM1 MISR                                  MISR_GLOBAL.3
000000000000157Nadir_Term_Crossing_to_Day       0000052501-03341999340161226
1990001000709               0000
ACTEVTAM1 MISR                                  MISR_ENG.1
000000000000156Nadir_Term_Crossing_to_Night     0000052501+03341999340170902
1990001000001               0000
ACTEVTAM1 MISR                                  MISR_GLOBAL.3
000000000000157Nadir_Term_Crossing_to_Day       0000052601-03341999340175120
1990001000709               0000
ACTEVTAM1 MISR                                  MISR_ENG.1
000000000000156Nadir_Term_Crossing_to_Night     0000052601+03341999340184756
1990001000001               0000
ACTEVTAM1 MISR                                  MISR_GLOBAL.3
000000000000157Nadir_Term_Crossing_to_Day       0000052701-03341999340193013
1990001000709               0000
ACTEVTAM1 CERES FORE SYSTEM                     CEF_ALONGTRACK:HIGH_BETA.1
000000000000114CERES_Elev_Danger_Zone_End       0000051002+02001999340171700
1999340171857               0000
ACTEVTAM1 CERES AFT SYSTEM                      CEA_ALONGTRACK:HIGH_BETA.1
000000000000097CERES_Elev_Danger_Zone_End       0000051002+00001999340171500
1999340171657               0000
ACTABSAM1 HGA                                   Slew to TDRS4.1
000000000000379                                                 1999339201737
1999339202115               0000
ACTABSAM1 HGA                                   Slew to TDRS2.1
000000000000377                                                 1999339210636
1999339211011               0000
ACTABSAM1 HGA                                   Slew to TDRS3.2
000000000000378                                                 1999340002236
1999340002648               0000
ACTABSAM1 HGA                                   Slew to TDRS2.1
000000000000377                                                 1999340010350
1999340011439               0000
ACTABSAM1 HGA                                   Slew to TDRS3.2
000000000000378                                                 1999340020240
1999340020653               0000
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ACTABSAM1 HGA                          Slew to TDRS2.1
000000000000377                                        1999340024442
1999340025531              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340034012
1999340034427              0000
ACTABSAM1 HGA                          Slew to TDRS2.1
000000000000377                                        1999340043044
1999340043505              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340051939
1999340052401              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340083646
1999340084109              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340092514
1999340092947              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340101620
1999340102043              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340110649
1999340111121              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340115549
1999340120017              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340124424
1999340124855              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340132713
1999340133146              0000
ACTABSAM1 HGA                          Slew to TDRS3.2
000000000000378                                        1999340142154
1999340142629              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340150828
1999340151525              0000
ACTABSAM1 HGA                          Slew to TDRS2.1
000000000000377                                        1999340165328
1999340165659              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340174202
1999340174537              0000
ACTABSAM1 HGA                          Slew to TDRS2.1
000000000000377                                        1999340183105
1999340183433              0000
ACTABSAM1 HGA                          Slew to TDRS4.1
000000000000379                                        1999340192135
1999340192511              0000
ACTABSAM1 Communications               E25_20K_NCC.3
000000000000373                                        1999339202136
1999339204636              0000
ACTABSAM1 Communications               E13_NCC.1
000000000000417                                        1999339211023
1999339213523              0000
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ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999339214500
1999339221000               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999339225000
1999339231500               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999339232500
1999339235000               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340002700
1999340005200               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340011500
1999340014000               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340020705
1999340023205               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340025552
1999340032052               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340034439
1999340040939               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340043526
1999340050026               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340052413
1999340054913               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340061300
1999340063800               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340070147
1999340072647               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340075034
1999340081534               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340084121
1999340090621               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340093008
1999340095508               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340102055
1999340104555               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340111142
1999340113642               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340120029
1999340122529               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340124916
1999340131416               0000
```

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ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340133803
1999340140303               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340142650
1999340145150               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340151537
1999340154037               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340160424
1999340162924               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340165711
1999340172211               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340174558
1999340181058               0000
ACTABSAM1 Communications                    E13_NCC.1
000000000000417                                         1999340183445
1999340185945               0000
ACTABSAM1 Communications                    E25_20K_NCC.3
000000000000373                                         1999340192532
1999340195032               0000
ACTABSAM1 ASTER                             AST_VNIR_POINTING.1
000000000000090                                         1999340143300
1999340143401               0000
ACTABSAM1 ASTER                             AST_SWIR_POINTING.1
000000000000067                                         1999340143700
1999340143801               0000
ACTEVTAM1 ASTER                             AST_START_V_S_T_OBS_STEREO.1
000939100000050Node_Ascending                0000052401+93201999340153330
1990001000001+0000.00+0000.001301
PRMAST_SET_T_MODE1[4]/POINT=0.000000e+00
(EU),AST_SET_T_MODE1[4]/SCAN=START,AST_SET_S_MODE1[5]/BAND4=NORMAL_GAIN,AST_SE
T_S_MODE1[5]/BAND5=NORMAL_GAIN
PRMAST_SET_S_MODE1[5]/BAND6=NORMAL_GAIN,AST_SET_S_MODE1[5]/BAND7=NORMAL_GAIN,A
ST_SET_S_MODE1[5]/PARITY=0.000000e+00,AST_SET_S_MODE2[6]/BAND8=NORMAL_GAIN
PRMAST_SET_S_MODE2[6]/BAND9=NORMAL_GAIN,AST_SET_S_MODE2[6]/PARITY=1.000000e+00
,AST_SET_V_MODE3[7]/BAND1=NORMAL_GAIN,AST_SET_V_MODE3[7]/BAND2=NORMAL_GAIN
PRMAST_SET_V_MODE3[7]/BAND3=NORMAL_GAIN
DAR0000002439
ACTEVTAM1 ASTER                             AST_END_V_S_T_OBS_STEREO.1
000939200000047Node_Ascending                0000052501+10261999340155559
1990001000109+0000.00+0000.000200
PRMAST_SET_T_MODE1[2]/POINT=0.000000e+00 (EU),AST_SET_T_MODE1[2]/SCAN=STOP
ACTEVTAM1 ASTER                             AST_START_T_OBS.1
000939300000062Node_Ascending                0000052701+26411999340192330
1990001000001+0000.00+0000.000201
PRMAST_SET_T_MODE1[3]/POINT=8.550000e+00 (EU),AST_SET_T_MODE1[3]/SCAN=START
DAR0000002441
ACTEVTAM1 ASTER                             AST_END_T_OBS.1
000939400000043Node_Ascending                0000052701+42401999340194559
1990001000008+0000.00+0000.000200
PRMAST_SET_T_MODE1[2]/POINT=8.550000e+00 (EU),AST_SET_T_MODE1[2]/SCAN=STOP
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ACTABSAM1 ASTER                                 AST_VNIR_POINTING.1
000000000000090                                                 1999340200000
1999340200101                0100
PRMAST_SET_V_ANGLE[2]/TO=8.550000e+00 (EU)
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999339202436
1999339204436                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999339214800
1999339220800                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999339232800
1999339234800                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340011800
1999340013800                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340025852
1999340031852                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340043826
1999340045826                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340061600
1999340063600                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340075334
1999340081334                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340093308
1999340095308                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340111442
1999340113442                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340125216
1999340131216                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340142950
1999340144950                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340160724
1999340162724                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340174858
1999340180858                0000
ACTABSAM1 SSR                                   SSR Playback
000000000000387                                                 1999340192832
1999340194832                0000
MODAM1 CERES FORE AZIMUTH DRIVE             Crosstrack
19993391505331999340171700000000.00000.0000
MODAM1 CERES FORE AZIMUTH DRIVE             Stopped
19993401717001999340171732000000.00000.0000
MODAM1 CERES FORE AZIMUTH DRIVE             Crosstrack
19993401717321999340171832000000.00000.0000
MODAM1 CERES FORE AZIMUTH DRIVE             270 (h)
1999340171832              00000.00000.0000
```

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MODAM1 CERES FORE ELEVATION DRIVE          X-Normal
19993391505331999340171700000000.00000.0000
MODAM1 CERES FORE ELEVATION DRIVE          Stow
19993401717001999340171732000000.00000.0000
MODAM1 CERES FORE ELEVATION DRIVE          X-Normal
19993401717321999340171832000000.00000.0000
MODAM1 CERES FORE ELEVATION DRIVE          X-Normal
1999340171832              00000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993391955491999339202136000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993392021361999339204636000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993392046361999339211023000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993392110231999339213523000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993392135231999339214500000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993392145001999339221000000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993392210001999339225000000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993392250001999339231500000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993392315001999339232500000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993392325001999339235000000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993392350001999340002700000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400027001999340005200000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400052001999340011500000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400115001999340014000000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400140001999340020705000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400207051999340023205000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400232051999340025552000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400255521999340032052000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400320521999340034439000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400344391999340040939000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400409391999340043526000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400435261999340050026000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
19993400500261999340052413000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
19993400524131999340054913000000.00000.0000
```

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MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340054913199934006130000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340061300199934006380000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340063800199934007014700000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340070147199934007264700000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340072647199934007503400000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340075034199934008153400000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340081534199934008412100000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340084121199934009062100000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340090621199934009300800000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340093008199934009550800000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340095508199934010205500000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340102055199934010455500000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340104555199934011114200000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340111142199934011364200000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340113642199934012002900000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340120029199934012252900000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340122529199934012491600000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340124916199934013141600000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340131416199934013380300000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340133803199934014030300000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340140303199934014265000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340142650199934014515000000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340145150199934015153700000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340151537199934015403700000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340154037199934016042400000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340160424199934016292400000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Unavailable
1999340162924199934016571100000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)              Service
1999340165711199934017221100000.00000.0000
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MODAM1 S-Band SA Uplink (SSAF)             Unavailable
1999340172211199934017455800000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
1999340174558199934018105800000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
1999340181058199934018344500000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
1999340183445199934018594500000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
1999340185945199934019253200000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Service
1999340192532199934019503200000.00000.0000
MODAM1 S-Band SA Uplink (SSAF)             Unavailable
1999340195032199934020141900000.00000.0000
MODAM1 CERES AFT AZIMUTH DRIVE             Crosstrack
1999339150333199934017150000000.00000.0000
MODAM1 CERES AFT AZIMUTH DRIVE             Stopped
1999340171500199934017153200000.00000.0000
MODAM1 CERES AFT AZIMUTH DRIVE             Crosstrack
1999340171532199934017163200000.00000.0000
MODAM1 CERES AFT AZIMUTH DRIVE             270 (h)
1999340171632             00000.00000.0000
MODAM1 CERES AFT ELEVATION DRIVE           X-Normal
1999339150333199934017150000000.00000.0000
MODAM1 CERES AFT ELEVATION DRIVE           Stow
1999340171500199934017153200000.00000.0000
MODAM1 CERES AFT ELEVATION DRIVE           X-Normal
1999340171532199934017163200000.00000.0000
MODAM1 CERES AFT ELEVATION DRIVE           X-Normal
1999340171632             00000.00000.0000
MODAM1 MODIS Formatter                     Night
1999339193955199933920292000000.00003.2000
MODAM1 MODIS Formatter                     Day
1999339202920199933921184900000.00010.6000
MODAM1 MODIS Formatter                     Night
1999339211849199933922081400000.00003.2000
MODAM1 MODIS Formatter                     Day
1999339220814199933922574200000.00010.6000
MODAM1 MODIS Formatter                     Night
1999339225742199933923470700000.00003.2000
MODAM1 MODIS Formatter                     Day
1999339234707199934000363500000.00010.6000
MODAM1 MODIS Formatter                     Night
1999340003635199934001260000000.00003.2000
MODAM1 MODIS Formatter                     Day
1999340012600199934002152800000.00010.6000
MODAM1 MODIS Formatter                     Night
1999340021528199934003045400000.00003.2000
MODAM1 MODIS Formatter                     Day
1999340030454199934003542200000.00010.6000
MODAM1 MODIS Formatter                     Night
1999340035422199934004434700000.00003.2000
MODAM1 MODIS Formatter                     Day
1999340044347199934005331500000.00010.6000
MODAM1 MODIS Formatter                     Night
1999340053315199934006224000000.00003.2000
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MODAM1 MODIS Formatter                          Day
19993400622401999340071209000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993400712091999340080134000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993400801341999340085102000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993400851021999340094027000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993400940271999340102955000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401029551999340111920000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401119201999340120848000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401208481999340125813000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401258131999340134742000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401347421999340143707000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401437071999340152635000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401526351999340161600000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401616001999340170528000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401705281999340175454000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401754541999340184422000000.00010.6000
MODAM1 MODIS Formatter                          Night
19993401844221999340193347000000.00003.2000
MODAM1 MODIS Formatter                          Day
19993401933471999340202315000000.00010.6000
MODAM1 MODIS                                    Science
1999335170000             00140.00000.0000
MODAM1 MODIS EDS                                Off
1999330170000             00000.00000.0000
MODAM1 MODIS BB                                 Off
1999337043900             00000.00000.0000
MODAM1 MODIS SD/SDSM                            Off/Off
1999335170000             00000.00000.0000
MODAM1 MODIS SRCA                               Off
1999339171830             00000.00000.0000
MODAM1 MODIS ELEC/SW                            Nominal
1999339195117             00000.00000.0000
MODAM1 MISR                                     XON
19993392025461999339203254000085.00003.1400
MODAM1 MISR                                     Global
19993392032541999339212223001 27.00006.4000
MODAM1 MISR                                     Eng
19993392122231999339220440000085.00000.0050
MODAM1 MISR                                     XON
19993392204401999339221148000085.00003.1400
MODAM1 MISR                                     Global
19993392211481999339230116001 27.00006.4000
```

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MODAM1 MISR                                        Eng
19993392301161999339234333000085.00000.0050
MODAM1 MISR                                        XON
19993392343331999339235041000085.00003.1400
MODAM1 MISR                                        Global
19993392350411999340004009001 27.00006.4000
MODAM1 MISR                                        Eng
19993400040091999340012226000085.00000.0050
MODAM1 MISR                                        XON
19993400122261999340012934000085.00003.1400
MODAM1 MISR                                        Global
19993400129341999340021902000127.00006.4000
MODAM1 MISR                                        Eng
19993400219021999340030120000085.00000.0050
MODAM1 MISR                                        XON
19993400301201999340030828000085.00003.1400
MODAM1 MISR                                        Global
19993400308281999340035756000127.00006.4000
MODAM1 MISR                                        Eng
19993400357561999340044013000085.00000.0050
MODAM1 MISR                                        XON
19993400440131999340044721000085.00003.1400
MODAM1 MISR                                        Global
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Appendix C. Issues

Following are issues identified during preparation of this White Paper. Others may surface as the operations concept is developed.

Item No.	Location	*Priority	Issue Description	Risk	Response	Status
1	Section 4.1	A	The minimum DAS period needs to be established such that no more than two consecutive DAS's are required to plan MISR production for one orbit. Suggested minimum is 2 hours.	Automated MISR production planning might not be possible if an adequate minimum is not set.	The nominal operation DAS period is coincidental with an operational day of 24 hours. The FOT has no intention of creating DASs of less than 24 hours unless an emergency or a very special spacecraft event occurs. During either of these extremely rare situations the ICCs will be well aware of the situations. If an emergency resolution DAS is required, the IOT will be well aware of the instrument team requiredn input. Situations such as these will be well coordinated at the time of the occurrence. It is unforeseen that even under the above conditions a DAS of less than two (2) hours will ever be required. If in the most unlikely situation that a DAS of less than two hours is required, the MISR DAAC team will manually combine the DASs to eliminate the software problem.	Closed
2	Section 4.3	A	Timelines for Cut-off of DAS inputs and for DAS distribution not well-defined.	Without timeline definition, there could be extreme deviations from the nominal timelines that could put automated MISR production planning at risk.	The cut-off for all late changes is 1300z, including an ASTER ODS or a spacecraft activity change from the FOT.The resulting ATC load must be generated by 1500z for this load to be uplink to the spacecraft. If the late schedule change can not be incorporated or resolved by 1500z, the change will be denied. Any time a requested late change is submitted the impacted parties are coordinated with. If no late changes occur for the spacecraft or any of the instruments, an updated DAS will not be issued. If a late change comes in and is processed by 1500z that has not affect on an instrument, the initial DAS delivered 27 hours prior to the beginning of the operation period remains in affect.	Closed

					Each instrument that submits a late change knows they have submitted a change that will require the DAS to be reprocessed. Never the less a DAS notification is sent out via email that the ATC load and DAS has been issued.	
3	Section 4.3	A	Figure 4-1 is valid only for the case of DAS's for the nominal operational day.	Needed to determine whether/how production planning can function for variable DAS periods.	The conops required to resolve an emergency or in a rare case where a DAS of less than 24 hours is undefined. A conops for this situation has not been developed since there is no such plans currently to ever do this. In the case that a spacecraft emergency has occurred the FOT reserves the right to plan such a DAS for resolution of these critical issue. In such a situation, it is envisioned that all of the instrument teams will be kept well informed to the state of the situation. Planning activities will not be a surprise and will not result in instrument operation problems.	Closed
4	Section 4.4	B	Causes of late change cutoff waivers or emergency schedule changes ill-defined in document	This is the first step to determining how notifications to instruments should be handled.	There are reasons identified in the white paper of why the late changes that meet the 1300Z cutoff might occur. From an operational perspective. All late changes that will be approved must meet the 1500z DAS and ATC load generation cut-off. If these changes can not meet this cut-off then the late changes will not be approved. Late changes that do not meet the 1500z cut-off can not get up linked to the spacecraft.	Closed

* Issue Priority Categories:

A = Design impact; e.g., an unresolved interface.

B = Minimal design impact; e.g., content or format of a specific field unresolved.

C = No design impact - administrative detail; e.g., reference document number is not available.

Abbreviations and Acronyms

ASTER	Advanced Spaceborne Thermal Emission and Reflection (Radiometer)
ATC	Absolute Time Command
DAS	Detailed Activity Schedule
DFCB	Data Format Control Book
ECS	EOSDIS Core System
EOC	EOS Operations Center
ESDIS	Earth Science Data and Information System
FDS	Flight Dynamics System
FOT	Flight Operations Team
ICC	Instrument Control Center
IOT	Instrument Operations Team
IST	Instrument Support Terminal
LG	Load Generation
MISR	Multi-angle Imaging SpectroRadiometer
MMS	Terra/AM-1 Mission Management System
SCC	Spacecraft Command Computer
TDRSS	Tracking and Data Relay Satellite System

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